Food Technology Abstracts

No. 170
DECEMBER 1981

National Information Centre
for Food Science and Technology,
Central Food Technological
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Compiled and Edited by :

BSN - B S Narahari Rao
KMD - K M Dastur
KAR - K A Ranganath
MVG - M V Gopinath
SVS - S V Sangameswaran
BV - B Vasu

National Information Centre for Food Science and Technology
Central Food Technological Research Institute, Mysore-570013
India.

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PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

GENERAL

2846 NIERING (K). Experience and knowledge from the production and application of freeze dried foods. *Lebensmittel-Industrie.* 27(6); 1980; 249-50 (German)

Based on the fundamental tasks of the central production plant of the MITROPA, experiences from the production and application of freeze dried foods are mentioned. In this connection, problems of the assortment as well as of the quality assurance are discussed. AA

FOOD PROCESSING AND PACKAGING

2847 CHAINE (C). Description of an infrared oven for drying leaf samples. *Oleagineux.* 35(1); 1980; 29-31 (French)

2848 ROSS (EW) Jr. Radiation-sterilization of food: Treating scanty data from inoculated packs. *J. Food Prot.* 42(12); 1979; 924-6

2849 KOCH (F), RODICKER (H) and SCHULZE (R). Considerations about the application of closed containers. *Lebensmittel-Industrie.* 27(6); 1980; 245-8 (German)

During short term temperature changes in the production process, a low pressure, may arise in closed tanks with "zero pressure", as a result of steam condensation and it may lead to the exceeding of the stability limit of the tanks. The possibilities of calculating the pressure development and the stability of the tanks are explained and hints have been given to avoid damages caused by low pressure. KMD

2850 GUISE (B). Bottle labelling. *Food Process. Ind.* 49(587); 1980; 40-5

FOOD ENGINEERING AND EQUIPMENT

2851 KRUGER (H-G). Duties, performance and objectives of maintenance services in the chemical industry. *Chemie-Ingenieur-Technik.* 52(2); 1980; 135-41 (German)

2852 DUNKER (H-W). Questions of noise reduction in the chemical industry (noise levels inside and outside industrial sites). *Chemie-Ingenieur-Technik.* 52(2); 1980; 141-8 (German)

FOOD CHEMISTRY AND ANALYSIS

2853 COSGROVE (DJ). The determination of *myo*-inositol hexakisphosphate (phytate). *J. Sci. Food Agric.* 31(12); 1980; 1253-6

A method for the determination of *myo*-inositol hexakisphosphate (phytate; P_6-*myo*-inositol) in plant material has been devised which involves the extraction of the sample with 0.3M trichloroacetic acid (TCA),

application of the diluted extract to an anion-exchange resin column in the TCA form, and elution of all phosphoric esters, other than P_6-*myo*-inositol, with 0.1M TCA. P_6-*myo*-inositol is then eluted from the column with 1.0M HCl and a suitable aliquot of this solution is assayed for phosphorus. AA

2854 HORWITZ (W), KAMPS (LR) and BOYER (KW). Quality assurance in the analysis of foods for trace constituents. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1344-54

FOOD MICROBIOLOGY

2855 CHRISTIAN (JHB). Take-away foods-microbiological aspects. *CSIRO FOOD Res. Q.* 40(2); 1980; 25-8

2856 FIRSTENBERG-EDEN (R), ROWLEY (DB) and SHATTUCK (GE). Inhibition of Moraxella-acinetobacter cells by sodium phosphates, and sodium chloride. *J. Food Sci.* 46(2); 1981; 579-82

Effects of phosphates alone or in combination with sodium chloride on the recovery (colony formation) of unstressed and heat-stressed cells of M-A in plate count agar (PCA) were investigated. Effects of phosphates, in order of decreasing ability were sodium tripolyphosphate (STPP), sodium pyrophosphate (SPP) and sodium orthophosphate (SP). Filter sterilised STPP was more effective than heat sterilised compound and the inhibitory effect was not related to pH. While an additive effect was obtained by certain combinations of STPP and NaCl, combination of NaCl and SPP produced a synergistic effect. In the case of heat stressed cells, more sensitivity was exhibited against levels of NaCl (0.8%) than those of STPP (0.1%) or SPP (0.12%). These levels, however, had no effect on colony formation in PCA by unstressed cells. MVG

2857 WONG (H-C) and KOEHLER (PE). Production and isolation of an antibiotic form *Monascus purpureus* and its relationship to pigment production. *J. Food Sci.* 46(2); 1981; 589-92

Culturing, purification and isolation of the fungal antibiotic Monascidin A. as well as the pigmentation changes during antibiotic production were studied. A static liquid culture medium (yeast extract, 0.8% and glucose 10%) was most suitable as most of the pigments accumulated in mycelium while the antibiotic dissolved in the medium. Major pigments were separated from biologically active fractions by silica gel adsorption chromatography using benzene:methanol:chloroform (30:19:9, v/v/v) as eluting solvent. Further purification was done using the same solvent on silica gel TLC plates resulting in two active fractions, a fluorescent yellow pigment and the pale yellow antibiotic. The minimum effective dosage of the purified antibiotic against *Bacillus Subtilis* was about 1.5 µg per 6 mm paper assay disc. MVG

YEAST

2858 SCHACHTEL (AP). Effects of preparative processes on the composition and functional properties of protein preparations from *Candida utilis*. *J. Food Sci.* 46(2); 1981; 377-82

Preparative processes included cell disruption, aqueous protein extraction, nucleic acid reduction, protein precipitation and spray or freeze drying. The composition of proteins varied with procedure used for protein concentration and nucleic acid reduction and was in the range of 48-57% crude protein and 2-11% RNA. Though heating processes, especially heat shocking of cells at 68 C with subsequent incubation at 50-55 C, had bad effect on functional properties (water binding capacity, emulsifying properties, nitorgen and protein solubility, fat absorption, foaming properties and bulk density), no procedure always affected these properties in the same way. The functional properties compared favourably with those of standard reference proteins, soy protein isolate and sodium caseinate. MVG

ALGAE

2859 BARTA (ES), BRANEN (AL) and LEUNG (HK). Nutritional analysis of puget sound bull Kelp (*Nereocystis luetkeana*). *J. Food Sci.* 46(2); 1981; 494-7

Proximate and elemental analysis and the protein quality evaluation of the algae was carried out. Freeze dried frond, stipe and bulb had similar composition, though frond had a protein content twice that of the other parts. The proximate composition of the frond was 15.3% protein, 1.3% crude fibre, 42.7% ash, 1.9% crude fat and 38.8% carbohydrate (by difference). It also contained appreciable amounts of sodium, potassium, calcium and iron. The protein prepared from the algae was of a superior quality as evaluated by the growth of *Tetrahymena pyriformis* W on an algal pepsin diet, amino acid profile and *in vitro* digestibility of the intact algae. MVG

MUSHROOM

2860 KOSTELC (JG) and HENDRY (LB). Hydrocarbon constituents from white strains of the mushroom *Agaricus bisporus* (Lange) Singer. *J. Agric. Food Chem.* 29(1); 1981; 185-6

2861 MAGA (JA). Mushroom flavour. *J. Agric. Food Chem.* 29(1); 1981; 1-4

After discussing the flavour chemistry of different mushroom and identification of volatiles present in them, the role and effect of processing on the volatiles of mushrooms have been described. The relationship between volatile compound formation and organoleptic properties of mushrooms have been indicated. BSN

FOOD ADDITIVES

2862 ANON. Keeping walls, floors and ceilings clean: A review of detergents, cleaning agents and contract services for keeping food processing plants clean. *Food Manuf.* 55(8); 1980; 33-5

863 ITO (Y), TOYODA (M), SUZUKI (H) and IWAIDA (M). Isotachophoretic determination of ethylenediamine tetraacetate in salad dressing, mayonnaise, and margarine. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1219-23

864 HURST (WJ), McKIM (JM) and MARTIN (RA) Jr. Determination of tartrazine in food products by HPLC. *J. Food Sci.* 46(2); 1981; 419-20,424

High performance liquid chromatography (HPLC) has been applied to the characterization and quantitation of tartrazine (FD&C Yellow 5) in a variety of food products. After extraction, HPLC analysis is complete within 10 minutes. Recovery studies of 93-97% indicate method accuracy from three food matrices. The method exhibits a %Cv of less than 5% for standards and samples. This method also separates Yellow 5 from Red 2, and Red 40. AA

865 FOGG (AG) and BHANOT (D). Voltametric determination of synthetic food colouring matters at a stationary glassy carbon electrode. *Analyst.* 105(1254); 1980; 868-72

Most of the permitted food colours in pH 2 Britton-Robinson buffer gave a well defined d.c. voltametric peak in the range 0.6-1.1 V (versus S.C.E.) at a stationary glassy carbon electrode. Food colours may be determined in the range of 2-100 μg ml^{1-1} with the help of peak currents, either directly or after extraction on polyamide columns. With accurate precision, the method is applicable for estimation of single food colours and also in quality control applications with some combinations of food colours. In the determination of amaranth in a black currant health drink, serious interference was observed. BSN

CEREALS

866 BLACK (HC), HSIEH (F-H), TIPPLES (KH) and IRVINE (GN). The GRL sifter for laboratory flour milling. *Cereal Food World.* 25(12); 1980; 757-60

The Grain Research Laboratory (GRL) sifter was designed and developed to replace the open rotating type of box sifter in laboratory flour milling with Allis-Chalmers roll stands. The GRL sifter units have a side-to-side action that carries the stocks in a zigzag pattern down the surface of a sloped sieve. This produces a mixing rather than a stratifying action. Results of a sifter comparison study indicated no change in extraction, bran contamination, or flour quality when the GRL sifter replaced the box sifter in laboratory milling. Milling time was reduced, and the new sifters could be completely cleaned after each sample was processed without removal of the sieves. AA

867 PLAYNE (MJ). Microbial conversion of cereal straw and bran into volatile fatty acids. Key intermediates in the production of liquid fuels. *Food Technol. Aust.* 32(9); 1980; 451-2, 454-6

Aspects covered include the substrate and their pre-treatment, volatile fatty acid (VFA) fermentation and its manipulation, separation of VFA from fermentation liquor, and conversion of VFA to liquid fuels. KAR

2868 STEWART (GA). The technology and economics of using cereal straw and bran as an energy source. *Food Technol. Aust.* 32(9); 1980; 447-8,450
Data on the energy generated by fermentation of cereal straw and bran have been presented and discussed. KAR

2869 LI (BW) and SCHUHMANN (PJ). Gas chromatographic analysis of sugars in granola cereals. *J. Food Sci.* 46(2); 1981; 425-7
Fourteen granola cereals from seven different manufacturers were analyzed for sugars with a gas chromatographic technique that determines the type and amount of all the common food sugars. The total sugar content of the cereals ranged from 22-32% of dry weight. Sucrose was the predominant sugar, along with varying amounts of fructose and glucose. Several cereals also contained lactose. New sampling procedures have been developed for these heterogeneous mixtures. AA

2870 STACK (ME) and EPPLEY (RM). High pressure liquid chromatographic determination of Satratoxins G and H in cereal grains. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1278-81

2871 BAKER (D) and HOLDEN (JM). Fiber in breakfast cereals. *J. Food Sci.* 46(2); 1981; 396-8
Data are presented on 410 samples belonging to 81 brands. The distribution of average NDF values (which ranged from 0-31%) indicated that 75.3% of the brands contained less than 5% fibre. Nested analysis of variance of fibre values shows that more than 99% of the variance can be attributed to differences among brands. MVG

RICE

2872 MOD (RR), NORMAND (FL), ORY (RL) and CONKERTON (EJ). Effect of hemicellulose in viscosity of rice flour. *J. Food Sci.* 46(2); 1981; 571-3, 578
Amylograph curves of both long- and medium grain rice flour with added water soluble bran hemicellulose were similar and had lowered viscosity. Ferulic acid- containing polysaccharide isolated from bran hemicellulose had similar effect on viscosity indicating that it might atleast be partly responsible for viscosity reduction after addition of bran hemicellulose. However, when endosperm hemicellulose was added back to intact flour, the amylograph curves were different. When hemicellulose was completely removed and added back in increasing amounts, changes in viscosity correlated with the amounts of hemicellulose added. MVG

2873 JHA (JS). Spectrophotometric studies of rice bran oil and mustard oil mixtures. I and II. *J. Am. Oil. Chem. Soc.* 57(2); 1980; 83-7
The visible spectra (range 520-700 nm) of unbleached mustard oil, rice bran oil, and ten mixtures of these oils have been reported. The mustard oil spectrum exhibits a characteristic band at 671.5 nm, while the rice bran oil spectrum shows two such bands at 550 and 564 nm, and a mixture centred around 656 nm. When a mixture contains about 5% of rice bran oil, the 564 nm begins to emerge, takes on a definite shape as the proportion of rice bran oil increases. The 671.5 nm band of mustard oil shows a uniform hypsochromic shift until the proportion

of admixed rice bran oil reaches 40% and thereafter, this shift becomes irregular. Thus, an approximate estimate can be made of the degree of adulteration of mustard oil with rice bran oil. Visible spectra (400-500 nm) of rice bran oil, mustard oil, and seven of their mixtures diluted 10 times in carbon tetrachloride are reported. Mustard oil shows three characteristic bands at 428, 453 and 482 nm, while rice bran oil shows no such band in this range of wavelength. Intensity of the 428 nm band increases as the percentage of rice bran oil in the mixture increases. Five indices (R_1 to R_5) have been suggested for the approximate determination of rice bran oil adulteration in mustard oil, and two of them, R_2 and R_3, are represented in by straight lines. The index $R_3 = 1000 (A_{428} - A_{482})$ has been found to most useful for the approximate estimation of rice bran oil in mustard oil. KMD

WHEAT

2874 NARA (JM), LINDSAY (RC) and BURKHOLDER (WE). Analysis of volatile compounds in wheat germ oil responsible for an aggregation response in *Trogoderma glabrum* larvae. *J. Agric. Food Chem.* 29(1); 1981; 68-72

2875 DAMIDAUX (R), AUTRAN (J-C) and FIELLET (P), Gliadin electrophoregrams and measurements of gluten viscoelasticity in durum wheats. *Cereal Food World.* 25(12); 1980; 754-6

The tests necessary in breeding of durum wheat varieties for cooking quality have been reviewed. KAR

2876 CAMIRE (AL) and CLYDESDALE (FM). Effect of pH and heat treatment on the binding of calcium, magnesium, zinc and iron to wheat bran and fractions of dietary fibre. *J. Food Sci.* 46(2); 1981; 548-51

The effect of pH and heat treatment on the binding of added food grade sources of calcium, magnesium, zinc, and iron to a standard wheat bran, cellulose, and lignin was investigated. 1% solutions of pectin and guar gum were examined for their ability to bind these metals in aqueous solution. Lignin and pectin was found to have high metal binding capacities. Metal binding to fiber was found to be pH dependent. Toasting had no effect on metal binding by cellulose, but had a significant effect on the binding of metals by lignin and wheat bran. Boiling had a significant effect on the binding of metals by cellulose, lignin, and wheat bran. AA

MILLETS

SORGHUM

2877 GLENNIE (CW). Preharvest changes in polyphenols, peroxidase, and polyphenol oxidase in sorghum grain. *J. Agric. Food Chem.* 29(1); 1981; 33-6

2878 CHAVAN (JK), KADAM (SS) and SALUNKHE (DK). Changes in tannin, free amino acids, reducing sugars, and starch during seed germination of low and high tannin cultivars of sorghum. *J. Food Sci.* 46(2); 1981; 638-9

Seedling growth and changes in tannin, starch, reducing sugars, and free amino acids were determined during germination of low and high tannin seeds of sorghum. The seedling growth was markedly suppressed in high tannin seeds as compared to low tannin seeds. About 73 and 20% tannins were lost during 120 hours germination in high tannin and low tannin seeds, respectively. Accumulation of reducing sugars, free amino-acids, and degradation of starch were considerably low in high tannin seeds as compared to low tannin seeds. It is suggested that tannins are responsible for retarding the seedling growth by decreasing the rate of starch and protein degradation in germinating high tannin seeds. AA

2879 AU (PM) and FIELDS (ML). Nutritive quality of fermented sorghum. *J. Food Sci.* 46(2); 1981; 652-4

The relative nutritive value (% RNV) of sorghum fermented at 25 C and at 35 C increased significantly ($P < 0.05$) over the % RNV of the control. During the consecutive 7-day fermentation at 25 C, time had no effect on the % RNV. The highest % RNV (56.45%) was achieved at the end of 1 day. Fermentation at 35 C was influenced by the time, with the highest % RNV (61.11%) obtained at the end of 7 days. Available lysine and methionine increased substantially ($P < 0.01$) over the control when sorghum was fermented at 25 C or 35 C for 4 days. Sorghum fermented at 25 C and at 35 C had methionine contents of 25.68 and 26.79 mg/g N, respectively, whereas the control contained only 11.25 mg/g N. Lysine levels were 33.2 and 34.5 mg/g N in sorghum fermented at 25 C and at 35 C, respectively, whereas the control contained 9.1 mg/g N. None of the available B-vitamins studied was altered significantly in the fermented samples. AA

MAIZE

2880 STAHR (HM), ROSS (PF) and OBIOHA (W). Some mycotoxin levels in farm-stored corn. *J. Agric. Food Chem.* 29(1); 1981; 207

Aflatoxin, zearalenone and T-2 toxin were observed in frozen samples of corn obtained from corn used for feeding animals. BSN

2881 SHANNON (GM), SHOTWELL (OL), LYONS (AJ), WHITE (DG) and GARCIA-AGUIRRE (G). Laboratory screening for zearalenone formation in corn hybrids and inbreds. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1275-7

2882 NAVEH (D), MIZRAHI (S) and KOPELMAN (IJ). Quantitative determination of peroxidase in sweet corn by chemiluminescence. *J. Agric. Food Chem.* 29(1); 1981; 36-8

BARLEY

2883 TORP (J). Variation in the concentration of major carbohydrates in the grain of some spring barleys. *J. Sci. Food Agric.* 31(12); 1980; 1354-60

PULSES

2884 WRIGHT (DJ) and BOULTER (D). Differential scanning calorimetric study of meals and constituents of some food grain legumes. *J. Sci. Food Agric.* 31(12); 1980; 1231-41

This paper presents the results of preliminary differential scanning calorimetry results conducted on the meals and extracted proteins of soyabean, field bean, cowpea, *Phaseolus* dry bean and three *lupin* species. KAR

2885 ALLI (I) and BAKER (BE). Constitution of leguminous seeds : The microscopic structure of protein isolated from *Phaseolus* beans. *J. Sci. Food Agric.* 31(12); 1980; 1316-22

Proteins were isolated from citric acid and sodium hydroxide extracts of *Phaseolus* beans. Bipyramidal crystalline and spheroidal protein were obtained from the citric acid extracts of the white kidney bean, the navy bean and the baby lima bean. Cubical crystalline, rosette and needle like structures were isolated from the navy bean. KAR

2886 HEIKES (DL). Mass spectral identification and gas-liquid chromatographic determination of methyl 4-chloroindolyl-3-acetate in canned and frozen peas. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1224-5

2887 SUMNER (AK), NIELSEN (MA) and YOUNGS (CG). Production and evaluation of pea protein isolate. *J. Food Sci.* 46(2); 1981; 364-6,372

Alkaline extraction and precipitation at the isoelectric point gave sodium proteinate and isoelectric products containing upto 90% protein. The product was dried by freeze drying, drum drying or spray drying. Chemical and functional characteristics, colour and flavour of the dried isolate compared favourably with those of soy protein. Sodium proteinates had generally more functionality than isoelectric isolates. Highest emulsification and water absorption values were given by freeze and spray drying. Spray drying gave the best foaming, colour and flavour properties. Drum drying decreased the nitrogen solubility index and increased water absorption. MVG

2888 RAO (MA), LEE (CY), KATZ (J) and COOLEY (HJ). A kinetic study of the loss of vitamin C. Colour and firmness during thermal processing of canned peas. *J. Food Sci.* 46(2); 1981; 636-7

The kinetic parameters, D and z, for the loss of colour, firmness, and vitamin C were determined during the thermal processing of peas canned in 303 x 406 cans. The D_{250} values for loss of colour, firmness, and vitamin C were 13.2 min, 9.2 min, and 246 min, respectively. The corresponding z values were: 69 F, 66 F, and 91 F, respectively. These results are in good agreement with those reported in the literature. With proper precautions and corrections for lags, kinetic parameters for the loss of quality parameters can be determined during thermal processing of foods in relatively large cans. AA

BENGAL GRAM

2889 SRIVASTAVA (KN), MEHTA (SL), NAIK (MS) and EGGUM (BO). Protein accumulation and protein quality of Bengal gram. (*Cicer arietinum*) cotyledons during development. *J. Agric. Food Chem.* 29(1); 1981; 24-7

WINGED BEAN

2890 UMADEVI SAJJAN (S) and WANKHEDE (DB). Carbohydrate composition of winged bean (*Psophocarpus tetragonolobus*). *J. Food Sci.* 46(2); 1981; 601-2, 605

The seeds contained about 42% of the total carbohydrates; starch alone accounted for 36.2%. The total monosaccharides constituted 2.7% and oligosaccharides only 0.61. The monosaccharides were identified as glucose (1.17%) and fructose (1.5%). The oligosaccharides were sucrose, raffinose, stachyose and verbascose. The major sugars of the cold water soluble gum of winged bean were glucose and xylose together with small amount of arabinose; the hot water soluble gum was a glucan type polymer. Hemicellulose A consisted of glucose, xylose and arabinose (15.5:9:1) while hemicellulose B consisted of exclusively of glucose indicating that it is also a glucan-type polymer. MVG

BROAD BEAN

2891 AL-OBAIDY (HM) and SIDDIQI (AM). Inhibition of bread bean lipoxygenase. *J. Food Sci.* 46(2); 1981; 597-600, 605

Phenolic antioxidants the broad bean coat itself, sulphydryl compounds and reagents and metal binding agents inhibited 50-fold purified enzyme lipoxygenase (E.C.1.13.1.13) from *Vicia faba*. Ca^{++} and Mn^{++} could reverse the inhibition by metal binding agents. There was complete loss of activity on dialysis with 1×10^{-3} M cyanide for 24 hours; the activity could be regained by addition of Ca. Complete denaturation of the enzyme occurred when heated at 75 C for 10 minutes. When fresh broad beans were blanched in boiling water or steam for 2 minutes, the enzyme was completely reactivated. MVG

2892 AL-OBAIDY (HM) and SIDDIQI (AM). Properties of broad bean lipoxygenase. *J. Food Sci.* 46(2); 1981; 622-5, 629

An improved method of assay of lipoxygenase (E.C.1.13.1.13) was introduced by initiating and following the reaction in the spectrophotometric cell. The enzyme was extracted from broad bean (*Vicia faba*) and purified fifty folds. It oxidized linoleate but not oleate and the rate of linoleate and linolenate oxidation were found to be practically the same. The enzyme had an optimum pH of 6.0 and an optimum temperature of 30 C. The activation energy was found to be 7.1 KCal/mole and the Km for linoleate 2.8×10^{-3} M. AA

MUNG BEAN

2893 REDDY (NR) and SALUNKHE (DK). Interactions between phytate, protein, and minerals in whey fractions of black gram. *J. Food Sci.* 46(2); 1981 564-7,.570

Whey from black gram (*Phaseolus mungo* L.) cotyledons containing proteins (albumin), phytate and minerals was studied for interactions between these components at pH 2.80, 6.40 and 8.40. Recovery of phytate after 48 hour dialysis was 45%, 69% and 4% respectively at pH 2.80, 6.40 and 8.40. At pH 2.80, complexation occurred between phytate and proteins. At pH 8.40, this complexation was mediated by divalent cations like Ca, Mg and Zn. At pH 6.40 there were higher concentrations of divalent cations than at pH 2.80 and 8.40. MVG

2894 SHEHATTA (AAY) and THANNOUN (MM). Extractability of nitrogenous constituents from Iraqi mung bean as affected by pH, salt, type and other factors. *J. Agric. Food Chem.* 29(1); 1981; 53-7

Factors influencing nitrogen extractability (pH, temperature, time and flour to solvent ratio) were studied extensively, and the extraction profile was determined with every variable when keeping other variables constant. In addition, the effects of seven salts in wide ranges of concentrations on nitrogen dispersibility were investigated. The maximum nitrogen extractabilities attained by these salts, arranged on a decreasing order, are as follows: 87.58% with 0.100 N sodium carbonate, 82.22% with 0.025 N sodium sulphite, 79.93% with 0.050 N sodium citrate, 78.78% with 0.500 N sodium chloride, 78.40% with 0.250 N sodium oxalate, 74.95% with 0.010 N sodium acetate, and finally 74.80% with 100 mg/L Na_2EDTA compared with 79.00% with distilled water. Moreover, when the trends of the nitrogen extractability patterns obtained for the seven salts were compared, it was possible to divide them into three general types. AA

GREEN BEAN

2895 DAVIS (DR) and WIESE (KF). Can pitting in green beans: Effect of growing season, base steel composition, tinplate thickness. can vacuum and storage conditions. *J. Food Sci.* 46(2); 1981; 428-31,456

Spring and fall grown green beans were packed under high and low vacuum conditions in high and low residual Al, Ni, Cu, Si,S, and Mn base steel .25 and .50 electrotin plated J-enamel cans and evaluated during storage at 38 C and room temperature for pitting on and under the side-seams. Cans containing spring grown beans were more severely pitted than those of the fall pack. High residual (0.061%) Cu steel cans were more severely pitted than other treatments. The .25 electrotin plated cans were more severely pitted in high Cu residual cans, as were the low vacuum spring pack cans at 38 C storage. AA

2896 CHEN (TS) and GEORGE (WL). Ascorbic acid retention of retort pouched green beans. *J. Food Sci.* 46(2); 1981; 642-3

The L-ascorbic acid (AA) retention in and sensory quality of green beans processed under home-canning conditions in retort pouches and metal cans were compared. Green beans processed in cans retained slightly more AA than that processed in the pouches, possibly due to overprocessing

of the pouched product. Metal cans offered better AA retention in the green beans than the retort pouches during 11 weeks of storage at 21 C, due mainly to a higher rate of AA degradation occurring in the pouched products during the first week of storage. Sensory evaluation showed that the retort pouched beans were significantly better ($p < 0.05$) than the canned green beans in flavour, texture, and overall acceptance, but not in colour. AA

COW PEA

2897 TELLA (AF) and OJEHOMON (OO). An extraction method for evaluating the seed proteins of cow pea (*Vigna unguiculata* (L). Walp.). *J. Sci. Food Agric.* 31(12); 1980; 1268-74

Extraction and estimation of albumins, globulins, glutelins and gliadins were done based on the differential solubilities of these fractions in buffered 2% NaCl, 0.01 M NaOH and 80% aqueous ethanol. Further analysis was done by polyacrylamide gel electrophoresis. The procedure is not suitable for very dark coloured seeds. KAR

RICE BEAN

2898 ARORA (RK), CHANDEL (KPS), JOSHI (BS) and PANT (KC). Rice bean : Tribal pulse of Eastern India. *Econ. Bot.* 34(3); 1980; 260-3

Discusses origin and cultivation of rice bean. KAR

GREAT NORTHERN BEAN

2899 SATHE (SK) and SALUNKHE (DK). Isolation, partial characterization and modification of the Great Northern Bean (*Phaseolus vulgaris* L.). Starch. *J. Food Sci.* 46(2); 1981; 617-21

The yield of starch was 18.23% of bean flour basis. The size of the granule ranged from 12 x 12 µm to 58 x 40 µm (length and width). The shape was round to oval to elliptical and in some cases concave. The starch contained 10.2% amylose (starch basis) and was more hydrolysed by hog pancreatic α-amylase than malt α-amylase. At room temperature (20 C) the starch had good water and oil absorption capacities. At concentrations of 7% and above (w/v), it formed a stable gel. As studied by viscoamylography the starch was found to have restricted swelling characteristic. MVG

2900 SATHE (SK) and SALUNKHE (DK). Studies on trypsin and chymotrypsin inhibitory activities, hemagglutinating activity, and sugars in the Great Northern Beans (*Phaseolus vulgaris* L.). *J. Food Sci.* 46(2); 1981; 626-9

The bean flour, albumins, protein concentrates and isolates were studied and bean flour and protein concentrates were evaluated for hydrogen gas production following ingestion in rats. The trypsin and chymotrypsin activity were reduced in protein concentrates by 75.32 and 84.78% respectively, and in protein isolates by 97.98 and 85.39% respectively. All the above products other than bean flour did not contain raffinose and verbascose; stachyose was present only in the albumin

to the extent of 14.69 mg/g. Protein concentrates were essentially without flatulence activity. Only bean flour had hemagglutinating activity. MVG

OILSEEDS AND NUTS

SOYABEAN

2901 ISLAM (MN) and LEA (RA). Effect of maturity on the amino acid composition and freezing quality of 'Emerald' soyabean. *J. Food Sci.* 46(2); 1981; 658-9, 63

2902 MORI (T), UTSUMI (S), INABA (H), KITAMURA (K) and HARADA (K). Difference in subunit composition of glycinin among soyabean cultivars. *J. Agric. Food Chem.* 29(1); 1981; 20-3

2903 MUSTAKAS (GC), MILLIGAN (ED), TABORGAA (J) and FELLERS (DA). Conversion of soyabean extraction plant in Bolivia to production of flours for human consumption : Feasibility study. *J. Am. Oil. Chem. Soc.* 57(2); 1980; 55-8

The modifications that are required in a commercial soyabean crushing plant to produce a food-grade soya flour have been studied. The various processing stages involved are : (a) pretreatment of the beans; (b) oil extraction; (c) meal desolventization; and (d) grinding and handling of the flour. Bacteriological control has to be maintained throughout the plant. The plant will handle up to 150 tonnes of soyabean per day; the capacity of the flash desolventizer system will have to be 100 t/d, and of the flour grinding system 50 t/d. KMD

2904 BAINTNER (K). Trypsin-inhibitor and chymotrypsin-inhibitor studies with soyabean extracts. *J. Agric. Food Chem.* 29(1); 1981; 201-3

A higher degree of heat resistance in the proteinase inhibitors of soyabean was observed in dry flours than after extraction by saline. With wet treatment, heat inactivation curve of trypsin- and chymotrypsin-inhibiting capacities showed wide variations. On being allowed to stand for long periods, trypsin and α-chymotrypsin would loose part of the inhibitory action. BSN

2905 LUTTRELL (WR), WEI (LS), NELSON (AI) and STEINBERG (MP). Cooked flavour in sterile Illinois soyabean beverage. *J. Food Sci.* 46(2); 1981; 373-6,382

Cooked flavour was found to be due to formation of H_2S during processing. It was also found that the amount of H_2S released was a function of process time at 250 F and was related to destruction of sulphur amino acids, particularly cystine. H_2S formation also increased with increase in pH from 7.0 to 8.0. During storage, particularly with the use of can enamel containing zinc oxide, H_2S concentration and cooked flavour intensity was reduced. MVG

2906 WANG (LC). Soyabean protein agglomeration: Promotion by ultrasonic treatment. *J. Agric. Food Chem.* 29(1); 1981; 177-80

2907 WEI (R-D), CHANG (S-C), and LEE (S-S). High pressure liquid chromatographic determination of aflatoxins in soysauce and fermented soyabean paste. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1269-74

PECAN

2908 POLLES (SG), HANNY (BW) and HARVEY (AJ). Condensed tannins in kernels of thirty-one pecan (*Carya illinoensis* (Wangenh) K. Koch) cultivars. *J. Agric. Food Chem.* 29(1); 1981; 196-7

GROUNDNUT

2909 COLLINS (JL) and POST (AR). Peanut hull flour as a potential source of dietary fiber. *J. Food Sci.* 46(2); 1981; 445-8, 451

The groundnut hull flour (PHF) produced from sheller-run hulls (yield 15-33%) averaged 47.3% crude fibre. It had a high amount (78.1%) of cell wall material which consisted of relatively large proportion of lignin, hemicellulose and cellulose. It also had 14 elements with higher concentrations of P, Ca, Mg and K. Holding capacities of PHF were 3.1 g. Water/g flour and 1.7 g oil/g flour, with cation capacity of 1.0 meg/g flour and of emulsifying capacity of 26.6 ml oil/g flour. The gross energy content of PHF was 4.57 K cal/g with about 0.52 K cal/g available in the monogastric digestive system. The PHF could be a potential dietary fibre.

2910 LAWHON (JT), MANAK (LJ), RHEE (KC) and LUSAS (EW). Production of oil and proteinfood products from raw peanuts by aqueous extraction and ultrafiltration. *J. Food Sci.* 46(2); 1981; 391-5, 398

A combination of aqueous extraction process and membrane isolation process was used to obtain oil and protein food products from raw groundnut. The spray-dried protein product had a high nitrogen solubility, bland taste and desirably light in colour. MVG

2911 AMAYA-F (J), YOUNG (CT), NORDEN (AJ) and MIXON (AC). Chemical screening of *Aspergillus flavus* resistance in peanuts. *Oleagineux.* 35(5); 1980; 255-9

2912 FARDIAZ (D) and MARKAKIS (P). Degradation of phytic acid in oncom (fermented peanut press cake). *J. Food Sci.* 46(2); 1981; 523-5

SUNFLOWER

2913 AFZALPURKAR (AB) and LAKSHMINARAYANA (G). Changes in chlorogenic, caffeic and quinic acid contents during sunflowerseed maturation. *J. Agric. Food Chem.* 29(1); 1981; 203-4

2914 TRUCKSESS (MW) and STOLOFF (L). Comparison of three methods for determining aflatoxins in sunflower seed meals. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1357-8

COTTONSEED

2915 REBER (EF). Safety of low gossypol cottonseed kernels. *J. Food Sci.* 46(2); 1981; 593-6

The safety of low gossypol raw, cooked, or roasted cottonseed kernels ground into flour was determined. Growing females utilized cooked or roasted cottonseed more efficiently than raw cottonseed or control diet. The percentages of pups alive at birth surviving to 4 days were significantly higher for rats fed raw or cooked cottonseed than roasted cottonseed. There were no significant differences observed in average body weight at parturition, at weaning time of dams or weight of offspring due to diet. No detrimental effects due to feeding cottonseed at 20% of the diet were observed. AA

RAPESEED

2916 EMBONG (MSB) and JELEN (P). Sulphur content of crude rapeseed oil from aqueous extraction. *J. Am. Oil Chem. Soc.* 57(2); 1980; 75-6

Dry heating of rapeseed before grinding increased the sulphur content of the crude rapeseed oil. Boiling the seeds in water before grinding caused a slight decrease in the sulphur level of the oil. Control of pH during boiling of the ground rapeseed increased the sulphur content of the oil from Ca 2 ppm at pH 3.1 to Ca .10 ppm at pH 7.6. AA

2917 AHMAD (I) and ALI (A). The effect of processing operations on the total sulphur content in rapeseed oil. *J. Am. Oil Chem. Soc.* 57(2); 1980; 76-7

The effect of refining operations on the total sulphur content of rapeseed oil was studied. Degumming (phosphoric acid treatment) had an insignificant effect on the sulphur content, while deacidification (alkali refining) removed about 30% and bleaching with Fuller's earth removed about 50% of the total sulphur in commercial crude oil. Deodorization affected nearly the complete removal of residual sulphur left after the application of treatments mentioned above. AA

PALM

2918 SCHWITZER (MK). Non-food uses for palm oil. *Oleagineux.* 35(5); 1980; 261-7 (German)

Palm oil constitutes about 9% of the world production of fats and oils. (4.5 out of 51 million tons). Malaysia produces nearly half of the world's palm oil. As more and more of this oil is being refined, an increasing amount of refining residues, or acid oils, is becoming available for a wide variety of non-food uses, notably for manufacture of soaps and animal feeds, and as a substitute for tallow. The process of fat splitting will open the gateway for, further processing of fatty acids and production of glycerol. Brief descriptions are given of the splitting process, of cold separation to produce stearic and oleic acids, and of hydrogenation of fatty acids, as well as of the different uses of fatty acids in the form of metal stearates, fatty amines, esters, and fatty alcohols. The paper ends with an economical

evaluation of the uses of inedible palm oil, and makes specific recommendations for a fatty acid industry in Malaysia. KMD

2919 DAVIS (JB) and REILLY (PJA). Palm oil mill effluent. A summary of treatment methods. *Oleagineux*. 35(6); 1980; 323-50 (French)

This paper is an updated version of two separate reviews on this topic, written by the authors during 1978 and 1979. After indicating, in outline, the origin and composition of the effluent, the scale of the associated treatment problem, and current legislative action, they turn to each of the many treatment methods which have been tried out on a laboratory or commercial scale, and even those which have merely been suggested, concentrating on those methods where useful by-products are obtained. Several of these methods are already being brought into commercial use, particularly in Malaysia. KMD

2920 BER-NIELSEN (B). Technical aspects of the quality of palm oil, with a view to its marketing. *Oleagineux*. 35(3); 1980; 155-9 (French)

The author has reviewed the efforts made, since 1951, by the Malaysian Oil Palm Industry to improve the quality of palm oil. Various factors which influence palm oil quality are discussed: free fatty acids content, humidity, and impurities, heavy metals, oxidation value, and bleachability. At present, Malaysian palm oil exports consist of 50% of crude oil, and 50% of refined oil. KMD

2921 BERGER (KG). Palm oil quality and use of end products. *Oleagineux*. 35(4); 1980; 213-6 (French)

Several specifications relating to the appearance, colour, slip melting point, iodine, Reichert, and Polenske values, flavour and odour, free fatty acids, moisture, foreign matter, ash, lead content, and stability towards oxidation of refined, bleached, and deodorized palm oils have been represented. The food uses of palm oil - viz., in shortening margarines, vanaspati, for frying, and for cooking - have been reviewed. Palm oil cannot be used as a salad oil, but it can be used in icecreams, if the law permits. Its properties can be modified by various processes (hydrogenation, refining, fractionation, interesterificaton) so as to increase its use. The various aspects of fats which make them an important constituent in foods, have been examined. KMD

TUBERS AND VEGETABLES

2922 COLE (RA). The use of porous polymers for the collection of plant volatiles. *J. Sci. Food Agric.* 31(12); 1980; 1242-9

The collection of plant volatiles on Porapak and Tenax GC and subsequent desorption for gas chromatography was investigated using synthetic mixtures similar to onion and cruciferous plants. Desorption of volatiles by heating from the porous polymers was more effective than eluting, and Tenax GC was found to be the more effective porous polymer for collecting compounds with retention times greater than 9 minutes on a carbowax, 20 M column, as from crucifers. Porapak Q was preferable for collecting compounds with retention times less than 9 minutes as from onions. KAR

2923 HUMPHRIES (C). Trypsin inhibitors in leaf protein concentrate. *J. Sci. Food Agric.* 31(12); 1980; 1225-30

Inhibitory activity was highest (50%) in lucerne LPC followed by fescue, Italian rye grass and quinoa in which it was 20%. Kale LPC had no inhibitory activity. Aqueous extraction of LPC decreased inhibitory activity, but solvents (propan-2-ol and acetone) were ineffective. Inhibitory activity in lucerne LPC was reduced by autoclaving but not in others. KAR

POTATO

2924 QUARMBY (AR). Determining the radial distribution of specific gravity within potato tubers. *J. Food Sci.* 46(2); 1981; 509-14

A computer program and its use has been described. MVG

2925 LAWRENCE (JF) and PANOPIO (LG). Comparison of gas and liquid chromatography for determination of anilazine in potatoes and tomatoes. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1300-3

2926 KING (RR). Analysis of potato glycoalkaloids by gas-liquid chromatography of alkaloid components. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1226-30

2927 COLEMAN (EC), HO (C-T) and CHANG (SS). Isolation and identification of volatile compounds from baked potatoes. *J. Agric. Food Chem.* 29(1); 1981; 42-8

Extensive GC analyses of Idaho Russet Burbank baked potatoes yielded 420 fractions of volatile flavour components. Of them 288 compounds identified by IR and MS included, hydrocarbons, acids, alcohols, aldehydes, esters, lactones, ethers, furans, halogenated hydrocarbons, ketones, pyrazines, oxazoles and thiazoles. Predominant compounds which accounted for baked potato flavour were pyrazines, oxazoles, thiazoles, and furanone. BSN

2928 HO (C-T) and COLEMAN (EC). Halogen compounds identified in the volatile constituents of baked potatoes. *J. Agric. Food Chem.* 29(1); 1981; 200-1

From Idaho Russet Burbank baked potatoes, volatiles were separated into relative pure fractions by repetitive GC. On analysis by GC-MS and IR spectrometry, fourteen halogenated compounds (1,1,1-trichloroethane, tetrachloroethylene, trichloroacetic acid, 2-chloropropane, chloroform, 1-chloroheptane, 1,1-dichloroheptane, 1-chloro-2-methyl butane, O-chloroaniline, 2-chlorobiphenyl, 2-bromo-5-ethylnonane, p-chloroaniline, 1-iodooctadecane and 1-chlorohexadecane) were identified. BSN

929 ERIKSEN (S). Protein nutritional quality of air classified potato fractions. *J. Food Sci.* 46(2); 1981; 540-2

The objective of this study was to determine the nitrogen distribution and the protein nutritional quality of air classified potato fractions and acid precipitated potato protein isolate produced from the fine fraction after air classification. The nutritional quality was determined on the basis of the amino acid composition of the various

fractions and chemical scores and essential amino acid index (EAAI) were used as parameters for protein nutritional quality. An improvement in chemical scores and EAAI was noticed in the fine fraction compared to the granules with a corresponding decrease in the coarse fraction. The essential amino acid indices for granules, coarse and fine fractions, and isolate were determined to be 63, 53, 67 and 96 respectively. AA

2930 LARSSON (K) and MIEZIS (Y). On the possibility of dietary fiber formation by interaction in the intestine between starch and lipids. *Starch.* 31(9); 1979; 301-2

Potato starch gels were exposed to monoolein solubilized in bile acid micelles and in the form of a cubic aqueous phase, in order to simulate the situation occuring in the intestine. The gels were degraded by pancreatic amylase, and this process was followed by colorimetric determination of dextrose equivalents(DE). A reduction in DE values after 1 hour by about 20% was observed in the starch gels first exposed to lipids compared to the situation when amylase was added directly to the same starch gel. This difference can be accounted for by assuming that the whole amylose fraction forms the helical amylose lipid complex, which is relatively stable against enzymatic degradation. The possibilities for such complexing reactions *in vivo* corresponding to formation of dietary fiber from pure starch and fat in the food, are discussed. AA

VEGETABLE

2931 SWARTZ (JB) and CARROAD (PA). A cooling system with water recycle for blanched vegetables. *J. Food Sci.* 46(2); 1981; 440-4

BEET ROOT

2932 LEE (YN) and WILEY (RC). Betalaine yield from a continuous solid-liquid extraction system as influenced by raw product, post-harvest and processing variables. *J. Food Sci.* 46(2); 1981; 421-4

RADISH

2933 WHEELER (WB), THOMPSON (NP), ANDRADE (P) and KRAUSE (RT). Extraction efficiencies for pesticides in crops: ^{14}C -benomyl extraction from mustard greens and radishes. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1286-90

SPINACH

2934 QUENZER (NM) and BURNS (EE). Effects of microwave, steam and water blanching on freeze fried spinach. *J. Food Sci.* 46(2); 1981; 410-3,418

Microwave blanching resulted in a superior freeze dried product as compared to steam and water blanching. It retained ascorbic acid better and had highly acceptable texture on rehydration. Microwave

did not cause damage to cell and tissue structure due to which the product had high rehydration ratios and acceptable textural characteristics. MVG

935 KLEIN (BP), KUO (CHY) and BOYD (G). Folacin and ascorbic acid retention in fresh raw, microwave and conventionally cooked spinach. *J. Food Sci.* 46(2); 1981; 640-1

Fresh spinach was assayed for total folacin and reduced ascorbic acid content, before and after cooking by a microwave and conventional method. Mean ascorbic acid content of raw, microwave cooked and conventionally cooked spinach was 26.5 mg/100 g, 13.5 mg/100g, and 17.0 mg/100 g, respectively. Ascorbic acid content was decreased significantly by both cooking methods; retention was 47% in microwave and 51% in conventionally cooked spinach. Total folacin content of raw, microwave, and conventionally cooked spinach was 161 mcg/100g, 183 mcg/100g, and 157 mcg/100g, respectively. Retention of folate was 77% in conventionally cooked and 101% in microwave cooked spinach. AA

936 KLIEN (BP) and KUO (CHY). Comparison of microbiological and radiometric assays for determining total folacin in spinach. *J. Food Sci.* 46(2); 1981; 552-4

Several commercially available forms of spinach were analyzed for total folacin content by the microbiological assay using *Lactobacillus casei* and a radiometric assay. Types of products included frozen uncooked, fresh raw, microwave and conventionally cooked fresh and creamed strained spinach. Folacin content ranged from 0.62 mcg/g for strained spinach to 2.50 mcg/g for uncooked frozen spinach, when assayed microbiologically. With the radiometric assay, folacin values were significantly higher ($P < 0.05$) than with the *L. casei* assay. The microbiological assay appears more suitable for determination of total folates in complex food matrices than the radioassay. AA

ALFALFA

937 CARROAD (PA), ANAYA-SERRANO (H), EDWARDS (RH) and KOHLER (GO). Optimization of cell disruption for alfalfa leaf protein concentrate (Pro-Xan) production. *J. Food Sci.* 46(2); 1981; 383-6

Electrical energy consumption of the grinding operation, with or without juce recycle, was investigated in order to optimise operating conditions to obtain maximum degree of cell rupture with minimum energy use. MVG

CABBAGE

938 STEVENS (BJH) and SELVENDRAN (RR). The isolation and analysis of cell wall material from the alcohol-insoluble residue of cabbage: (*Brassica oleracea* Var. *capitata*). *J. Sci. Food Agric.* 31(12); 1980; 1257-67

The composition and structural features of the cell wall material (CWM) and some of the polysaccharides solubilised have been investigated by acid hydrolysis and methylation analysis. Methylation analysis of the cold water soluble polysaccharides showed that the main neutral glycosidic linkages in descending order of concentration were: non-

reducing terminal arabinose groups, and 5-linked arabinose, and 4-linked galactose. The CWM contained a high level of arabinose-containing pectic polysaccharides. KAR

TOMATO

2939 LOPEZ (A) and WILLIAMS (HL). Essential elements in fresh and canned tomatoes. *J. Food Sci.* 46(2); 1981; 432-4, 444

Atomic absorption spectrophotometric analysis of 16 essential elements showed significantly higher amounts of calcium, chloride, cobalt, copper, nickel, sodium, tin and zinc in canned tomatoes than in fresh ones. However, the amounts of magnesium, manganese, phosphorous, potassium and silicon were significantly lower. No significant differences in iron content was found between canned and fresh tomatoes. MVG

2940 MUNDT (JO) and DAESCHEL (MA). Survival of *Klebsiella pneumoniae* heated in buffer and in tomato juice. *J. Food Prot.* 42(12); 1979; 933-5

Klebsiella pneumoniae survived nonexponentially when heated in phosphate buffers at pH 7.0 and 4.3 and in tomato juice at pH 4.3. At 60 C, an initial inoculum of 10^9 cfu/ml decreased by 6 log units in 15 minutes with a long tailing of the survivors to 75 minutes of heating. At 67 C, total destruction of *K. pneumoniae* was attained in both buffers at 25 minute and in tomato juice at 40 minute. Factors influencing heat resistance of the bacterium are discussed. AA

DRUMSTICK

2941 RAMACHANDRAN (C), PETER (KV) and GOPALAKRISHNAN (PK). Drumstick (*Moringa oleifera*) : A multipurpose Indian vegetable. *Econ. Bot.* 34(3); 1980; 276-83

Article describes, botany and nomenclature, origin and distribution, tree description, plant parts used and their composition, varieties, propagation, yield, and pests, and medicinal uses. KAR

BREAD FRUIT

2942 GRAHAM (HD) and NEGRON de BRAVO (E). Composition of the bread fruit. *J. Food Sci.* 46(2); 1981; 535-9

Skin, stem plus heart and pulp of very immature, immature, mature and very mature fruits of *Artocarpus communis* were studied for nutrient content. They varied widely in most cases depending on the part and maturity of fruit. In all the 3 parts at all stages of maturity, the major component was starch (more than 50% of total carbohydrate). Minerals Ca, K, and Fe and vitamins niacin and riboflavin were present relatively good levels in all parts at all stages of maturity. Protein content and crude fat varied in the different parts respectively which is as follows: 4.6-5.9% in skin, 6.0-7.6% in stem plus heart and 3.8-4.1% in pulp and 2.3-3.9% in skin, 1.6-4.4% in stem plus heart and 1.1-2.6% in pulp. Crude fiber was highest in skin and stem plus heart and lowest in pulp. MVG

FRUITS

2943 RIPPON (LE). Wastage of post-harvest fruit and its control. *CSIRO Food Res. Q.* 40(1); 1980; 1-12

The review covers damage caused by post-harvest spoilage, nature and cause of post-harvest diseases, modes of infection, factors influencing disease severity, control of post-harvest diseases by environment control and by chemical treatments, and some useful fungicides for post-harvest treatment. KAR

2944 SPEIRS (CI), BLACKWOOD (GC) and MITCHELL (JR). Potential use of fruit waste containing *in vivo* de-esterified pectin as a thickener in canned products. *J. Sci. Food Agric.* 31(12); 1980; 1287-94

Orange peel and tomato skins were treated with sodium carbonate to pH 8.5 to cause *in vivo* pectin de-esterification principally by pectinesterase action. The resulting material was dried and powdered and then evaluated for thickening properties in canned systems. It was found that after autoclaving for 75 minutes at 121.1 C in a rotating retort in the presence of guar gum, sodium tripolyphosphate and calcium sulphate dihydrate, high post process viscosities could be obtained when orange peel was included at a concentration of 0.5% provided the pectin degree of esterification was reduced below 20% and the intrinsic viscosity of the pectin measured after extraction was above 3 dlg^{-1}. Thickening was also obtained with tomato skins providing these two conditions were fulfilled. The dependence of viscosity on the calcium level and the thixotropic nature of the solutions obtained after processing, demonstrate that a calcium pectate gel can be formed even after severe heat treatment at a neutral pH. It is suggested that fruit and vegetable material containing *in vivo* deesterified pectin may be of value as a thickener in canned foods. AA

2945 RICHMOND (ML), BRANDAO (SCC), IAN GRAY (J), MARKAKIS (P) and STINE (CM). Analysis of simple sugars and sorbitol in fruit by high-performance liquid chromatography. *J. Agric. Food Chem.* 29(1); 1981; 4-7

The HPLC procedure described combines the use of two bonded phase carbohydrate columns, joined in a tandem; a ternary mobile phase (acetonitrile-water-ethanol and a differential refractometer to accurately and precisely separate fructose, glucose, sorbitol, sucrose, and maltose. For the five-sugar mixtures, total time taken for analysis was 120 minutes. Twenty four fruits were analyzed for presence of sorbitol. Recoveries ranged from 98% for fructose to 102% for maltose. BSN

STRAWBERRY

2946 SPAYD (SE) and MORRIS (JR). Influence of immature fruits on strawberry jam quality and storage stability. *J. Food Sci.* 46(2); 1981; 414-8

Puree from ripe (R), and immature (IM) strawberry fruits (cultivars, 'Cardinal' and A-5344) were used for jam preparation in following blends: 25% R + 75% IM; 50% R + 50% IM; 75% R + 25% IM; and 100% R. The jam colour and flavour for all combinations were acceptable

initially and after storage at 2 C for 6 and 12 months. At 25 C, A-5344 jam from 25 and 50% R became unacceptable after 6 and 12 months respectively. At 35 C all jams were unacceptable after 6 months. Acceptability of colour depended more on total anthocyanins rather than R%. MVG

GRAPE

2947 MARCY (JE), CARROLL (DE) and YOUNG (CT). Changes in free amino acid and total nitrogen concentrations during maturation of muscadine grapes (*V. rotundifolia*). *J. Food Sci.* 46(2); 1981; 543-7, 551

2948 BARNETT (D). Dried grapes. The involvement of lipids in their production. *CSIRO Food Res. Q.* 40(1); 1980; 16-22

The role of oil treatment in enhancing drying rate and in imparting some qualities to dried grapes is discussed. KAR

2949 STAFFORD (AE), FULLER (G) and BOLIN (HR). Loss of fatty acid esters from grape surfaces during drying. *J. Am. Oil Chem. Soc.* 57(2); 1980; 70-2

Fatty acid esters can reduce the drying time of grapes, by about two-thirds, by interacting with the waxy surface of the grapes. Thompson Seedless grapes were dipped in a water emulsion containing 2% fatty acid ester, 2% sodium carbonate, and an emulsifier; the grapes were then dried at 43 C and 71 C. There was a large loss of esters during drying, presumably caused by vapour distillation of the esters. An additional dip during drying reduced the drying time significantly. KMD

2950 WISSEMANN (KW) and LEE (CY). Characterization of polyphenoloxidase from Ravat 51 and Niagara grapes. *J. Food Sci.* 46(2); 1981; 506-8, 514

Polyphenoloxidase (PPO) was isolated from two varieties of grapes grown in the northeastern United States and its characteristics were studied. The temperature and pH optima for both enzyme were 25 C and 5.5, respectively. The thermal inactivation of PPO followed first-order kinetics; with the Niagara enzyme being more heat stable than Ravat PPO. The substrate specificity of the grape PPO clearly showed high affinity towards the o-diphenolic compounds, with a high affinity towards caffeic acid. Inhibition studies indicated that L-cysteine and sodium diethyldithiocarbamate were the most potent. AA

2951 BARANOWSKI (JD) and NAGEL (CW). Isolation of 1-epicatechin and d-catechin by column chromatography. *J. Agric. Food Chem.* 29(1); 1981; 63-4

BANANA

2952 MARRIOTT (J), Banana : Physiology and biochemistry of storage and ripening for optimum quality. *CRC Crit. Rev. Food Sci. Nutr.* 13(1); 1980; 41-88

Discusses : physiological factors (development and maturation, measurement of preclimacteric period, effect of temperature, chemicals and other factors and ethylene on preclimacteric period, storage in modified and controlled atmospheres, irradiation effects, ripening and

senescence, ripening in modified atmospheres); biochemical changes (pectins, phenolics, acids, lipids, volatiles, proteins, amino acids and other changes); integration and control of ripening (biogensis and mode of action of ethylene, control of preclimacteric period, control of metabolic pathways and proteins synthesis, permeability changes during the climacteric, mechanism of control of ripening) and storage, compositional changes and eating quality of different *Musa* groups (sensory comparisons, diploid cultivars, dessert triploid cultivars, cooking triploid cultivars, tetraploid cultivars). BSN

CITRUS

2953 IWATA (Y), CARMAN (GE), O'NEAL (JR), BARKLEY (JH), DUSCH (ME) and GUNTHER (FA). Phenthoate applied to California citrus trees: Residue levels of foliage and soil, in air and on and in fruit. *J. Agric. Food Chem.* 29(1); 1981; 135-45

ORANGE

2954 BRADDOCK (RJ) and CRANDALL (PG). Carbohydrate fiber from orange albedo. *J. Food Sci.* 46(2); 1981; 650-1, 654

APRICOT

955 STRAND (LL), OGAWA (JM), BOSE (E) and RUMSEY (JW). Bimodal heat stability curves of fungal pectolytic enzymes and their implication for softening of canned apricots. *J. Food Sci.* 46(2); 1981; 498-500, 505

Pectolytic activity can be isolated from canned apricots showing severe softening induced by a single fungal lesion. The pectolytic activities of fungi important in causing progressive softening have bimodal heat stability curves with minimal stabilities at 70-80 C. The activities produced by fungi that do not cause appreciable softening do not show bimodal stability curves. A 6-minutes treatment at 75 C before canning eliminated detectable enzyme activity and significantly reduced subsequent softening in No. 303 cans of apricots to which single fruit halves with 5 mm fungal lesions had been added. These results suggest that a pretreatment at about 75 C could help alleviate this problem in canned apricots. AA

WOOD APPLE

956 MacLEOD (AJ) and PIERIS (NM). Volatile flavour components of wood apple (*Feronia limonia*) and a processed product. *J. Agric. Food Chem.* 29(1); 1981; 49-53

Representative samples of the aroma volatiles of wood apple - a tropical fruit - and a canned, processed product (wood apple cream) were obtained by means of a modified Likens and Nickerson apparatus using trichlorofluoromethane as the solvent. Extracts were concentrated by a low-temperature-high-vacuum distillation procedure, and components of resultant essences were identified as far as possible by GC-MS using both EI and CI mass spectrometry. Odour evaluation at an odour port

during GC revealed three components described as having characteristic wood apple aroma - methyl hexanoate, ethyl 3-hydroxyhexanoate, and butanoic acid. Most aroma components were esters (~45% of the total sample) and included β-hydroxy esters which have previously only been located in tropical fruits. Two similar series of chemically closely related compounds were recognized, together comprising ~ 70% of the samples. Overall wood apple cream provided very similar results to wood apple fruit and was therefore a good preserved substitute. AA

APPLE

2957 FURR (AK), PARKINSON (TF), ELFVING (DC), BACHE (CA), GUTENMANN (WH), DOSS (GJ) and LISK (DJ). Elemental content of vegetables and apple trees grown on syracuse sludge-amended soils. *J. Agric. Food Chem.* 29(1); 1981; 156-60

2958 SCOTT (KJ), HARDISTY (SE) and STAFFORD (IA). Control of bitter pit in early picked Granny Smith apples from Western Australia. *CSIRO Food Res. Q.* 40(2); 1980; 29-32

Bitter pit in apples (2 varieties studied) can be controlled by dipping the fruit in commercial calcium chloride flakes at 40 g per litre. Inclusion of diphenylamine in the dipping solution further improved the control of disorder. This combined treatment was superior to either vacuum or pressure infiltration of calcium chloride, was less costly to apply and did not cause injury. KAR

2959 CHIBA (M) and VERES (DF). High performance liquid chromatographic method for simultaneous determination of residual benomyl and methyl 2-benzimidazole carbamate on apple foliage without cleanup. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1291-5

KIWI FRUIT

2960 WILDMAN (T) and LUH (BS). Effect of sweetener types on quality and composition of canned Kiwi nectars. *J. Food Sci.* 46(2); 1981; 387-90

Nectars with different added sweetener types (sucrose alone or sucrose and corn syrup in different combinations) had no significant differences in flavour though sweetener types and citric acid caused some differences in sweetness scores as indicated by sensory panel. Objective measurements showed little differences in consistency among nectars with different sweetener types. MVG

SUGAR, STARCH AND CONFECTIONERY

2961 GIANGIACOMO (R), MAGEE (JB), BIRTH (GS) and DULL (GG). Predicting concentrations of individual sugars in dry mixtures by near-infrared reflectance spectroscopy. *J. Food Sci.* 46(2); 1981; 531-4

To support research in nondestructive quality evaluation of fruits and vegetables, near infrared reflectance spectroscopy was used to measure concentrations of fructose, glucose, and sucrose in model systems

intended to represent the major constituents of dried apple tissue. Spectra (950-1850 nm) of a series of known samples were recorded, and multiple linear regression techniques were used to relate the concentrations of each sugar to reflectance measurements at selected wavelengths. Reflectance measurements at 3 computer-selected wavelengths for each sugar were used to predict the concentrations in an independent set of samples. Correlation coefficients for actual vs predicted values were 0.995 for fructose, 0.994 for glucose, and 0.986 for sucrose, while the respective standard errors computed as variation from the regression lines were 1.48%, 1.39% and 1.44%. AA

2962 JEURING (HJ) and KUPPERS (FJEM). High performance liquid chromatography of furfural and hydroxymethyl furfural in spirits and honey. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1215-8

2963 WITCHWOOT (A), CRNJAR (ED) and NAWAR (WW). Influence of polyunsaturation on thermal decomposition of saturated triacylglycerols. *J. Agric. Food Chem.* 29(1); 1981; 192-3

2964 AGARWAL (SKD) and VEENA GUPTA. Spectrophotometric studies on the complexes of metal ions with caramel. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G9-G14

Spectrophotometric evidence has been produced to show that caramels interact with metallic ions such as Cu^{+2}, Cd^{+2}, Ni^{+2}, Co^{+2} and Zn^{+2} to form complexes. This appears to be the first study on complex formation by metals with substances of high molecular weight. KMD

2965 AGNIHOTRI (CB) and PRABHU (KA). Pilot plant trials on the treatment of distillary waste using aerobic processes. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G15-G25

An active sewage sludge, acclimatized to distillary waste, was treated in a pilot plant scale by an activated sludge process and biofiltration. It was shown that the aerobic techniques employed, viz. extended aeration, contact stabilization, step aeration, etc., followed by biofiltration can bring down the BOD of the distillary waste by about 80-85%. KMD

2966 JUNEJA (LR), SESHAYYA (M) and MITRA (AK). Further studies on recovery and recycling of yeast for the production of alcohol. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G27-G34

Increasing the yeast cell concentration (from 0.75×10^8 to 2.5×10^8 cells/ml) was found to be an effective method for reducing fermentation time from 25 to 16 hour. The deterimental effect of high temperature on alcohol fermentation also could be minimised by increasing yeast cell concentration. The yeast could be reused more than ten times, provided the optimum conditions were maintained. KMD

2967 JOSHI (MG), APTE (HR) and SHYAMSUNDER (C). Disposal of sugar factory and distillery effluent : Problems and prospects. *Proc. 44th Ann. Con-. Sugar Technol. Assoc. India.* 1980; G35-G43

The author hold the opinion that the anaerobic lagooning process, normally advocated by Pollution Boards, does not yield constant and desired results, and the norms suggested by Indian Standard Institution are difficult to achieve. Concentrating distillery effluent,

and using it as a potash rich fertilizer for making compost along with filter mud, boiler ash, excess bagasse, filth, etc., offers a clearly better alternative to the disposal problem. KMD

2968 SAIGAL (D) and VISWANATHAN (L). Effect of clarification of molasses on alcoholic fermentation. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G45-G53

When molasses were clarified by various methods - egg albumin, ammonium sulphate, superphosphate + ammonium sulphate, superphosphate + lime, potassium ferrocyanide, and sulphuric acid - it was found that their ash and calcium content decreased, while the fermentation efficiency increased. The authors believe that lowering of the pH of molasses by sulphuric acid, followed by heating, is the simplest and most effective method for clarification of molasses and for increasing alcohol yield. The fermentation efficiency increased from 80% to 94% by sulphuric acid treatment and centrifugation. KMD

2969 KAPOOR (BD) and MISRA (AK). An inexpensive method of pre-treatment of molasses for distillery industry. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G55-G63

When molasses are diluted with water to 45-50 C, their viscosity is reduced and the suspended solids are quickly separated by sedimentation. Molasses pre-treated this way have about 12.5% higher total sugar (sugar/ash ratio 5.2 as against 4.63) and about 23.1% less calcium. The wash from pre-treated molasses gives more than 1% higher recovery of alcohol, as compared to wash from untreated molasses. The low ash content, viz. 8-10% in the yeast sludge on dry weight basis, makes the molasses fit both for recycling in the fermentation process as well as for edible purposes. KMD

2970 DHAMIJA (SS), DAHIYA (DS) and BARDIYA (MC). Yeast screening and fermentation studies on beet molasses. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G65-G73

Thirty strains of yeast were tested, under laboratory conditions, for their capacity to ferment beet sugar molasses, and three Indian strains were found capable of carrying the fermentation to completion. Because of the slow rate of yeast multiplication in beet molasses, their fermentation was slower than that of cane sugar molasses. KMD

2971 BHATT (CS), AGRAWAL (PK) and VISHWANATHAN (L). Commercial manufacture of citric acid by fermentation. VIII. Effects of some alcohols and crude extracts on production of citric acid by *Aspergillus niger*. *Proc. 44th Ann. Conv. Sugar Technol. Assoc.* 1980; G75-G86

Th effect of the addition of methyl, ethyl, and isopropyl alcohols at 1-3% v/v level, and of some crude extracts (beef, yeast, malt, peptone, and casein hydrolysate) at 0.05-0.2% level v/v, on the production of citric acid by *Aspergillus niger* was studied. Addition of methyl or ethyl alcohol (at 1% and 3% level respectively) increased significantly the mycelial growth from 0.77 g (dry weight) to 0,99 and 1.30 g respectively. The maximum citric acid yield of 53.72% of anhydrous citric acid, was obtained by adding 3% of ethyl alcohol to the medium. Methyl alcohol at 3% level inhibited citric acid production slightly, while isopropyl alcohol inhibited it completely at 1, 2 and 3% levels. Among the extracts, beef extract at 0.2% level was most

effective in stimulating citric acid production; yeast extracts decreased it slightly, while all the other crude extracts increased in slightly. Mycelial growth was enhanced markedly by these extracts. KMD

2972 MANGAL SINGH AND PAUL (BB). New technology for augmenting cellulosic raw materials for pulp and paper. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G87-G97

Methods (of predrying bagasse, essentially) have been suggested which will enable sugar-cane bagasse to become a permanent source of raw material for the pulp and paper industries. An assessment of the economic viability of such a project has also been furnished. KMD

2973 SESHAYYA (M), JUNEJA (LR) and MITRA (AK). Alcoholic fermentation of molasses using immobilized yeast. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G103-G9

Alcoholic fermentation was carried on with the help of yeast immobilized on a cheap and easily available carrier (viz. a polymer). Ten batches of molasses were fermented in 5 days; the fermentation time was 5 hours in the first batch, and increased progressively to 9 hours for the 11th batch. This techniqe raised the fermentation efficiency to 88-91.7%, as compared to the 86% efficiency achieved in a conventional fermentation. KMD

2974 GUPTA (KC), SURI (SK) and BOSE (S). Oxalic acid from deionized sugarcane juice. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G119-G25

Studies have been made on the production of oxalic acid from concentrated, deionized sugarcane juice (70° brix) by oxidation with nitric acid. The yield of oxalic acid obtained was 1.83 per mole of available hexose, and its purity was 99.5%. KMD

2975 SHARMA (KN) and KOCHHAR (RK). Drying of bagasse. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India* 1980; G127-G32

The authors have turned their attention towards maximization of the generation of heat energy in a sugar factory, and have designed, for every boiler, an integral system which is capable of drying bagasse to a moisture content of 40-42° by means of stack gases. KMD

2976 AGRAWAL (PK). Some aspects of alcohol production from mohwa flowers. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G133-G42

One can get in India about 200,000 ton of mohwa flowers, per annum; these flowers are rich not only in fermentable sugars, but also in many nutrients favourable for a high fermentation efficiency. They represent therefore, a potential source for the production of 60,000,000 l. of alcohol per year, i.e. 10% of the annual production of alcohol in India at present. KMD

2977 DUBEY (RS). Manufacture of CO_2 from fermenter gas. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G143-G57

The author has presented a preliminary project profile on the manufacture of carbon dioxide-liquid and solid- from distillery fermenter gas. If an established firm of distributors, that can invest in gas cylinders is associated with the project, the cost can be very low, and the industry can be very profitable. KMD

2978 RAMAIAH (NA) and TEWARI (KM). Studies on kinetics of crystallization of sucrose. Effect of Mn and Co salts. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M1-M8

Salts of Mn and Co, upto a certain concentration, increase the rate of sucrose crystallization from molasses, and therefore have a beneficial role in pan- boiling sugar factories. The increased rate constant, in the presence of minute quantities of Mn and Co may be due to ionic interaction with the sucrose; and the decreased rate at higher concentrations may be due to the melassigenic nature of the salts, which form complexes with sugar. KMD

2979 MISHRA (SP) and SHUKLA (SP). Experience with the working of Buckan Wolf continuous horizontal centrifugals, Model C 1100, on C and B massecuites. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M9-M18

Due to a breakdown of the multistage pressure pump at the Barabanki sugar factory, it became necessary to cure B and C massecuites in three, Buckan-Wolf, horizontal, continuous, centrifugal machines, Model C 1100. A capacity of 1 to 1.5 ton per hour, at 35 ampere load and 40 C, was achieved with a properly conditioned C massecuite. This capacity is expected to increase in the future. Further improvement is expected when the arrangements for reheating of massecuites are completed. KMD

2980 VENUGOPAL RAO (P) and RAJENDER REDDY (M). Preparation of reproducible seed slurry and monitoring of the seed size by sedimentation method. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M25-M30

When a low-grade massecuite station showed a tendency towards formation of false grains, the defect was traced to the variable size of seed grain. The situation was remedied by 2-3 hour extra grinding time, which resulted in a uniform crystal size of 5 microns. As the microscopic measurement of crystal size is time-consuming and involves human fatigue a simple method of measuring seed size by determining the sediment volume was evolved. Methods based on centrifugal and photosedimentation are also discussed. KMD

2981 BHARGAVA (JC) and SINHA (KP). Studies on neutralization of the second carbonated juice with phosphoric acid. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M31-M9

Filtered, second carbonation juice (pH 8.2-8.5) was neutralized with 10% phosphoric acid instead of SO_2; addition of phosphoric acid led to the formation of a heavy, floculating precipitate which not only occludes colloidal impurities, but also adsorbs much of the colouring matter. It will also reduce, or completely eliminate syrup sulphitation, and reduce the consumption of sulphur in the carbonation process of clarification. KMD

2982 JOHRI (SC). Modification in design of 2nd carbonation tank at Bagpat. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M41-M51

Thedesign of the second carbonation tank in the sugar factory at Bagpat was modified by providing an arrangement for peripheral withdrawal of juice, and introducing a star distributor in the bottom cone. Thus, it was possible to ensure that the fluid flowed along the path of least resistance, and efficient mixing of the reactants was achieved, in spite of the fact that there is insufficient CO_2 gas in the second

carbonation tank to provide perfect circulation. This modification has brought about a considerable decrease of the ash content in clear juice, resulting in the production of very good quality sugar, and a reduction in boiler house losses. KMD

2983 CHAKRAVARTY (B). Important parameters for continuous treatment to final massecuites. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M53-M64

A continuous treatment system for final massecuites should approximate to the conditions that prevail for good batch cooling and reheating crystallizer in a particular factory or zone. The principal parameters that need to be determined for this purpose are: retention time, rate of cooling, rate of reheating, maturing time for both the cooling and reheating processes, and the final reheating temperature. The equipment after the crystallizers should be capable of handling materials of high viscosity and compacticity. Modern continuous centrifuges are better suited than batch centrifuges. KMD

2984 MISHRA (SP). Gas-liquid absorption equipment for a carbonation factory : Development of a continuous reactor design for second carbonation, thin juice sulphitation, and syrup sulphitation. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M65-M8

A chemical reactor has been designed which gives an improved performance for the three unit processes of continuous second carbonation, continuous thin juice sulphitation, and continuous syrup sulphitation. It can be manufactured in India, and operated in a carbonation sugar factory. KMD

2985 SINGH (PK). Pan station performance. *Proc. 44th Ann. Conv. Sugar Technol. Assoc.India* 1980; M69-M72

Several factors that govern pan station performance have been combined in a formula that gives a quantitative value of pan station performance. KMD

2986 SHARMA (SC) and JOHARY (PC). Elimination of phenolic constituents of cane juice in clarification adsorption, a positive possibility of removal of sugar compounds. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M73-M92

The authors have studied the adsorption of mono-, di, and trihydroxy phenols on the surfaces of various Ca salts (viz., sulphite, carbonate, and phosphate), and also the influences of concentration, pH, temperature, and period of contact on the removal of phenols. In particular, the adsorption of the phenolics present in cane juices on pure Ca salts has also been studied. It is concluded that phenolic constituents are eliminated during clarification of cane juice by their adsorption on various precipitates of Ca salts formed during the clarification reaction. KMD

2987 KAKADE (GG) and NEHERE (SL). On bringing down the "Downtime". *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M93-M103

Various modifications made in the "evaporator station" of a sugar factory have enabled the authors to eliminate any body, including the vapour cell, for cleaning, without stopping the plant. Various arrangements of evaporator bodies have been discussed. KMD

2988 RAMA RAO (KS) and PRASADA RAO (MJV). On-line continuous Brix-meter for evaporator syrup. *Proc. 44th Ann. Conv. Sugar Technol. Assoc.India.* 1980; M105-M8

This on-line Brix-meter, made in India which works on the principle of variation of the pressure created by a column of liquid, when its density changes. Measurement of the difference in pressure between a column of syrup and a column of water makes it possible to read off the Brix value directly. The accuracy of the system is ± 1.5%, and a recorder can be attached to it. KMD

2989 RANDHAWA (NS). Automatic pH control in sugar factory. *Proc. 44th Conv. Sugar Technol. Assoc. India.* 1980; M109-M14

An automatic lining and pH control system, as developed by the Central Electronic Engineering Research Institute, Pilani, was tried at a sugar factory with a continuous juice sulphitor, for two seasons. The pH fluctuations of sulphured juice decreased from ± 0.75 to ± 0.15, and purity increased by 0.2 units, over and above the increase of 0.5 units obtainedby manual control. KMD

2990 JOSHI (NN), GOEL (SK) and KAPOOR (R). Designing and operational aspects for lime kilns in carbonation sugar factories. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M115-M25

The discussion covers different types of lime kilns, used in the sugar industry for the production of lime. Vertical-type, mixed feed kilns which are the most common type in use all over the world, have been discussed in detail, with special attention to efficient operation with deteriorating quality of lime stone and hard coke; thermal efficiency; single cone vs, double cone designs; CO_2 pumping capacity and nett availability of CO_2. Recommendations have been made for the improved working of kilns. KMD

2991 MISHRA (SP). "Phospho/Carbonation/Phosfloatation" technology and manufacture of superior white granulated sugar. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; M127-M39

As reported earlier, the method of phospho-carbonation could solve most of the technical problems of the double-carbonation, double-sulphitation process. A further refinement has now been introduced, viz. a system of syrup and melt clarification. This technology, called "Phospho-Carbonation-Phosfloatation" has, in its first trial season (1979-80), given excellent results in terms of reduction of process losses, and improvement in the quality of the finished product. KMD

2992 BHATT (CS), AGRAWAL (PK) and VISWANATHAN (L). Commercial manufacture of citric acid by fermentation. VII. Effects of some fats and oils on citric acid fermentation by *Aspergillus niger*. *Proc. 44th Ann. Conv. Sugar Technol. Assoc. India.* 1980; G1-G7

Seven fatty oils, three fatty acids, and seven essential oils were tested for their stimulating effect on citric acid production by *Aspergillus niger*, by surface fermentation on a synthetic medium. The quantity of oil added to the medium was 1% v/v or w/v. The maximum production of citric acid (60 mg/ml) was obtained with a mustard oil supplement; this corresponded to an yield of 42.86% anhydrous citric acid, with respect to the quantity of sugar initially present, Butter fat also increased citric acid production (from 45.4 mg/ml for the control sample to 53 mg/ml). All the other fats and fatty acids decreased citric acid

production. On the other hand, citric acid production was depressed by all the essential oils that were tested, excepting turpentine oil which increased it marginally. Mirabane oil almost completely inhibited citric acid production. Butter fat and mustard oil also increased mycelial growth from 0.57 g dry weight to 0.80 and 0.82 g dry weight respectively. KMD

2993 ALFONSO (FC), MARTIN (GE) and DYER (RH). High pressure liquid chromatographic determination of 5-(Hydroxymethyl)-2-furaldehyde in caramel solution. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1310-3

2994 SAHA (BC), MITSUE (T) and UEDA (S). Glucoamylase produced by submerged culture of *Aspergillus oryzae*. *Starch*. 31(9); 1979; 307-14

Aspergillus oryzae grown in wheat bran submerged culture produced three forms of glucoamylase, designated as glucoamylase I, II and III. They were obtained in the ratio of 51:3:1. Glucoamylase I, readily hydrolyzed soluble starch to about 90% and had a strong debranching activity. Glucoamylase II and III hydrolyzed soluble starch to about 75% and had weak debranching activity. Glucoamylase I, was further purified by rechromatography, gel filtration, preparative isoelectric focusing on carrier ampholyle and again gel filtration. Glucoamylase I, was fairly stable at pH range between 5.5 to 7.0 and temperature upto 40 C. The limit of hydrolysis of soluble starch was 80% and the liberated product was only glucose. AA

2995 HOLLO (J), FODOR (L) and GAL (S). The role of starch in urea-feeding. *Starch*. 31(9); 1979; 303-6

2996 PRAZNIK (W) and EBERMANN (R). Application of synthetic amyloses as standards in gel chromatographic molecular weight determination of starches. *Starch*. 31(9); 1979; 288-93 (German)

BAKERY PRODUCTS

2997 STRASSBURG (H). Macaroni products from Erfurt. *Lebensmittel-Industrie*. 27(6); 1980; 259-60 (German)

First experience and results of the reconstruction of the pasta factory Erfurt, have been stated. In this connection the economic benefit and also the role of the innovators' work have been dealt with. AA

2998 EWART (JAD). Loaf volume and the intrinsic viscosity of glutenin. *J. Sci. Food Agric.* 31(12); 1980; 1323-36

The intrinsic viscosities of glutens and glutenins from 36 English-grown wheat were highly correlated with their loaf volume per gram of protein. It was proved that the molecular weight of the glutenin is an important contributor to the baking quality of wheat. It was concluded that genetic factors are important in controlling intrinsic viscosities of gluten and glutenin. KAR

2999 SAAB (RMGB), RAO (CS) and DA SILVA (RSF). Fortification of bread with L-lysine HCl : Losses due to baking process. *J. Food Sci.* 46(2); 1981; 662-3

A Brazilian water bread was formulated with wheat flour (100%), salt (2%), yeast (5%), water (60%), fungal amylase (130 SKB/100g wheat flour), ascorbic acid (0.02%), and polysorbate-60 (1%). To the formulation was added lysine -HCL at levels of 0.1, 0.2, 0.3, 0.4 and 0.5% as related to wheat flour in the formulation. The breads (fortified and control) were baked at 220 C for 20 minutes. The retention of lysine was estimated by measuring the free lysine-HCl in bread with FDNB. A regression equation was developed relating the input and retention of lysine, which indicated a loss or destruction of 11.3% of added lysine during baking process. AA

3000 KIM (YJ) and ROBINSON (RJ). Effect of surfactants on starch in a model system. *Starch.* 31(9); 1979; 293-300

The text deals with the effect of surfactants which are used as 'improvers' in the production of bread and other baked goods. KMD

MILK AND DAIRY PRODUCTS

MILK

3001 International Symposium : Dairy goats. *J. Dairy Sci.* 63(10); 1980; 1591-1781

The following papers were presented at the Symposium : G.F.W. Haenlein : Status of world literature on dairy goats. Introductory remarks (p.1591-9); K. Leach: Trends in dairy goats (p.1600-4); R. Jenness: Composition and characteristics of goat milk: Review 1968-1979 (p.1605-30); M. Loewenstein, S.J. Speck, H.M. Barnhart, and J.F. Frank: Research on goat milk products: A review (p.1631-48); E. Harris: Southern Agriculture Corporation's experience in marketing goat dairy products (p.1649-54); O.P.S. Sengar: Indian research on protein on energy requirements of goats (p.1655-70); P. Morand-Fehr and D. Sauvant: Composition and yield of goat milk as affected by nutritional manipulation (p. 1671-80); A.N. Bhattacharya: Research on goat nutrition and management in Mediterranean middle east and adjacent Arab countries (p.1681-700); E.A. Gihard, EM. El-Bedaway and A.Z. Mehre: Fiber digestibility by goats and sheep (p.1701-6); J. Harmeyer and H. Martens: Aspects of urea metabolism in ruminants with reference to the goat (p.1707-28); C.F.W. Haenlein: Mineral nutrition of goats (p.1729-48); Ashkolnik, Maltz.E. and S. Gordin: Desert conditions and goat milk production (p.1749-54), C. Devendra: Milk production in goats compared to buffalo and cattle in humid tropics (p.1755-67); C. Gall: Relationship between body conformation and production in dairy goats (p.1768-81). BSN

3002 DARRINGTON (H). The Danish dairy industry. *Food Manuf.* 56(3); 1981; 33-5

3003 CLAPPERTON (TL), KELLY (ME), BANKS (JM) and ROOK (JAF). The production of milk rich in protein and low in fat, the fat having a high polyunsaturated fatty acid content. *J. Sci. Food Agric.* 31(12);1980; 1295-1302

Feeding a diet of pelletised, ground dried grass and flaked maize has resulted in the production of milk with a lower fat content, a higher protein content and a milk fat containing a lower proportion of fatty acids upto 16:0 and a higher proportion of the 18-carbon fatty acids, 18:2 and 18:3. KAR

3004 TOBA (T), ADACHI (S) and ARAI (I). Sunlight and sodium hypochlorite induced colour changes in milk. *J. Dairy Sci.* 63(11); 1980; 1796-801

Colour changed in milk with exposure to sunlight for 1 to 2 hour and to fluorescent light or ultraviolet light for 4 to 5 hours. Milk also discoloured with sodium hypochlorite of more than 200 ppm available chlorine. Both colour changes were caused principally by degradation of tryptophan and tyrosine in milk proteins. The former discolouration was accompanied by a significant loss of riboflavin. AA

3005 TAYLOR (MJ) and RICHARDSON (T). Antioxidant activity of skim milk : Effect of heat and resultant sulphydryl groups. *J. Dairy Sci.* 63(11); 1980; 1783-95

Skim milk was evaluated for antioxidant activity in a linoleate emulsion with hemoglobin as a prooxidant. Milk sulphydryl groups were measured with Ellman's reagent in the presence or absence of a denaturant. Heat treatment of skim milk increased antioxidant activity, increased "reactive" sulphydryl groups, but decreased "total" sulphydryl content. Addition of iodoacetic acid to raw or heated skim milk decreased antioxidant activity and sulphydryl content. However, the role of the sulphydryl group in the antioxidant activity of skim milk was not clear. Cysteine had a marked optimum in antioxidant activity at pH 8.6, but the antioxidant activity of heated skim milk, which was optimal at pH 7.2, was much less pH dependent. The antioxidant activity of skim milk resided in both whey and casein proteins. Casein provided a larger portion of skim milk antioxidant activity, but casein had only a small amount of sulphydryl groups. The antioxidant activity of casein was reduced but not eliminated by treatment with iodoacetic acid. After treatment with iodoacetic acid, whey lost all antioxidant activity, but whey sulphydryl content was not eliminated fully. Skim milk supplemented with cysteine or treated with sodium borohydride had greatly increased sulfhydryl content but little increase in antioxidant activity. Sulfhydryl groups were apparently responsible for only part of the antioxidant activity of skim milk. AA

3006 TAYLOR (MJ) and RICHARDSON (T). Antioxidant activity of skim milk: Effect of Sonication. *J. Dairy Sci.* 63(11); 1980; 1938-42

3007 JUVEN (BJ), GORDIN (S) and LAUFER (A). Significance of psychrotrophic strains of *Serratia liquefaciens* in milk. *J. Food Prot.* 42(12); 1979; 938-41

3008 RITTER (JA), LANGLOIS (BE) and O'LEARY (J). Effect of five surface area-to-sample volume ratios during preliminary incubation on the bacterial count of raw milk. *J. Food Prot.* 42(12); 1979; 968-70

3009 HANKIN (L), LACY (GH), STEPHENS (GR) and DILLMAN (WF). Antibiotic-resistant bacteria in raw milk and ability of some to transfer antibiotic resistance to *Escherichia coli*. *J. Food Sci.* 42(12); 1979; 950-3

3010 SOOD (VK) and KOSIKOWSKI (FV). Ultrafiltration of skim milk at high temperature. *J. Food Prot.* 42(12); 1979; 958-60

3011 VAN SCHOTHORST (M), VAN LEUSDEN (FM), De GIER (E), RIJNIERSE (VFM) and VEEN (AJD). Influence of reconstitution on isolation of *Salmonella* from dried milk. *J. Food Prot.* 42(12); 1979; 936-7

3012 DOUGLAS (FW), GREENBERG (R), FARRELL (HM) Jr. and EDMONDSON (LF). Effects of ultra-high-temperature pasteurization on milk proteins. *J. Agric. Food Chem.* 29(1); 1981; 11-5

3013 WILLETT (LB). Polychlorinated biphenyls from dairy farms. Consequence in market milk. *J. Dairy Sci.* 63(11); 1980; 1961-5

3014 PARRISH (FW), HICKS (K) and ODNER (L). Analysis of lactulose preparations by spectrophotometric and high performance liquid chromatographic methods. *J. Dairy Sci.* 63(11); 1980; 1809-14

3015 RICHTER (RL), GEHRIG (TC), DILL (CW) and BLAKE (RW). Diacetyl accumulation in mixed-strain lactic acid cultures with antioxidants. *J. Dairy Sci.* 63(11); 1980; 1829-33

CHEESE

3016 CARROAD (PA) and PERRY (CA). Influence of washing on properties of small curd cottage cheese made on the pilot scale. *J. Dairy Sci.* 63(11); 1980; 1815-8

Unwashed and washed small curd cottage cheeses were produced by three-step washing treatments with deionized water adjusted to pH 4.5 and by cooling in whey, respectively, resulting in temperatures of about 35 C, 28 C, and 16 C after each step. Washed curd was firmer than unwashed curd and contained lower percent total solids and more casein. Washed and unwashed curds showed separate relationship between firmness and total solids but a common relationship for firmness versus casein content. AA

3017 AYLWARD (EB), O'LEARY (J) and LANGLOIS (BE). Effect of milk storage on cottage cheese yield. *J. Dairy Sci.* 63(11); 1980; 1819-25

The effect of storage of raw milk for up to 12 days at 5 C on the yield of cottage cheese was investigated. Grade A raw milks were obtained from the University of Kentucky dairy herd and from the bulk fluid milk supply at a local processor. Cottage cheese was manufactured by the short-set (5 hours) and long-set (14 hours) procedures. Yield of cottage cheese decreased with an increase in time that raw milk was stored. Yield decreases were 2.5 to 3% per day of low temperature storage after the bacterial count of raw milk attained 10^6/ml. These decreases occurred in the first 2 days of added storage of the bulk fluid milk from the local processor. Noncasein and non-

protein nitrogen increased as time of storage of raw skim milk increased. Bacterial analysis of the raw skim milks showed rapid increases in standard plate, psychrotrophic and proteolytic counts. Coliform count also exhibited a rapid increase, but the final population was not as large as psychrotrophic and proteolytic counts. AA

3018 LAZARIDIS (HN), ROSENAU (JR) and MAHONEY (RR). Enzymatic control of meltability in a direct acidified cheese product. *J. Food Sci.* 46(2); 1981; 332-5, 339

An enzymatic method based on a fungal protease derived from *A. oryzae* was developed to control the meltability of a direct acidified cheese product. The kinetics of activation and inactivation were delineated. Meltability values, as determined by the standard L.D. Schrieber test, were strongly correlated with proteolysis as measured in terms of nonprotein nitrogen (NPN). Excessive proteolysis resulted in textural and organoleptic defects (short and grainy texture, bitterness). Optimum conditions for enzymatic action were delineated in terms of desirable rheological characteristics and overall product quality. AA

3019 LAU (OW) and MOK (CS). Spectrophotometric determination of inorganic chloride in butter and margarine. *J. Sci. Food Agric.* 31(12); 1980; 1275-8

A simple and accurate spectrophotometric method for the determination of inorganic chloride in butter and margarine has been developed. The new method is based upon the aqueous mercury (II) thiocyanate method in which thiocyanate liberated by chloride reacts with iron (III) to give an iron (III)-thiocyanate complex with an absorption maximum at 476 nm. AA

ICE CREAM

3020 MOORE (LJ) and SHOEMAKER (CF). Sensory textural properties of stabilized ice cream. *J. Food Sci.* 46(2); 1981; 399-402, 409

Two methods of texture evaluation (time-intensity and graphic rating or line-marking) were used with vanilla ice cream samples with 5 different levels of sodium carboxymethylcellulose (CMC). Time-intensity method gave significant correlation between CMC concentration and textural properties of iciness, viscosity and melting time, while the graphic rating method gave correlations between CMC concentration and textural properties of coldness, iciness, viscosity and firmness. Significant correlation for iciness and viscosity were found between the two methods. Results show that the two methods are complementary to each other. MVG

MEAT AND POULTRY

3021 DUBOSE (CN), CARDELLO (AV) and MALLER (O). Factors affecting the accetability of low-nitrite smoked, cured ham. *J. Food Sci.* 46(2); 1981; 461-3

Satisfactory colour gave a significantly increased acceptability in this product through other attributes like flavour may be inferior.

The warning regarding the possible dangers of sodium nitrite had no effect on the consumer acceptability. MVG

3022 BOUTON (PE) and HARRIS (PV). Changes in the tenderness of meat cooked at 50-65 C. *J. Food Sci.* 46(2); 1981; 475-8

3023 BARBAGLI (C) and CRESCENZI (GS). Influence of freezing and thawing on the release of cytochrome oxidase from chicken's liver and from beef and trout muscle. *J. Food Sci.* 46(2); 1981; 491-3

The process of freezing and thawing animal tissues causes a remarkable release of cytochrome oxidase from mitochondria. The activity of cytochrome oxidase in extracts of tissues after freezing and thawing increases by 15 times in chicken's liver, by 2.5 times in trout, and by 4 times in beef muscle, as compared to extracts of unfrozen samples. These results suggest that the measurement of cytochrome oxidase activity can be used to develop a rapid and simple method which would allow distinguishing between unfrozen and frozen and thawed tissues. AA

3024 MA (K) and MAXCY (RB). Factors influencing radiation resistance of vegetative bacteria and spores associated with radappertization of meat. *J. Food Sci.* 46(2); 1981; 612-6

BEEF

3025 SHIBAMOTO (T), KAMIYA (Y) and MIHARA (S). Isolation and identification of volatile compounds in cooked meat: Sukiyaki. *J. Agric. Food Chem.* 29(1); 1981; 57-63

GLC/MS isolation of sukiyaki volatiles from beef, heated with vegetables and seasonings (sugar and soyasauce) under simulated cooking conditions, yielded forty four compounds. These were identified, among others as furans, ketones aldehydes, esters, acids, alcohols, pyrazines, hydrocarbons and pyrroles. By employing a thermal energy analyzer combined with GC, dimethylnitrosamine was identified at a level of 0.02 ppb. BSN

3026 BITTEL (RJ), GRAHAM (PP), YOUNG (RW) and BOVARD (KP). Mechanically separated spleen : Its composition and protein efficiency ratio. *J. Food Sci.* 46(2); 1981; 336-9

3027 ELGASIM (EA), KENNICK (WH), McGILL (LA), ROCK (DF) and SOELDNER (A). Effects of electrical stimulation and delayed chilling of beef carcasses on carcass and meat characteristics. *J. Food Sci.* 46(2); 1981; 340-3, *349*

3028 CONTRERAS (S), HARRISON (DL), KROFF (DH) and KASTNER (CL). Electrical stimulation and hot boning: Cooking losses, sensory properties, and microbial counts of ground beef. *J. Food Sci.* 46(2); 1981; 457-60

3029 CONTRERAS (S) and HARRISON (DL). Electrical stimulation and hot boning: Colour stability of ground beef in a model system. *J. Food Sci.* 46(2); 1981; 464-7

3030 KOTULA (AW) and EMSWILER-ROSE (BS). Bacteriological quality of hot-boned primal cuts from electrically stimulated beef carcasses. *J. Food Sci.* 46(2); 1981; 471-4

3031 COLE (AB) Jr. and DAVIS (GW). Influence of post-mortem aging period on the fragmentation index of bovine Longissimus muscle. *J. Food Sci.* 46(2); 1981; 644-5

3032 McMILLIN (DJ), SEBRANEK (JG) and KRAFT (AA). Microbial quality of hot-processed frozen ground beef patties processed after various holding times. *J. Food Sci.* 46(2); 1981; 488-90

3033 RACCACH (M) and HENRICKSON (RL). Microbial aspects of mechanical tenderization of beef. *J. Food Prot.* 42(12); 1979; 971-3

The exterior parts of mechanically tenderized, beef rounds and rib eye had an aerobic plate count (22 C) of 10-15,000/g, while the count for the interior parts of the same cuts was 10/g. Cleaning and sanitizing the tenderizer with an iodine-based sanitizer (25 ppm titratable iodine) decreased the bacterial population of both the conveyor belts and blades from 1000/cm^2 to <10/cm^2. *Clostridium perfringens* and *Salmonella* were not detected from the exterior and interior parts of the tenderized outside round. *Staphylococcus aureus*, total enterobacteriaceae and the coliform group were each at a level of <10/g. Vacuum packaging of tenderized outside round and storage at 16 C for 18-20 hours did not significantly increase either the aerobic or anaerobic bacterial counts. KMD

3034 DeFOUW (CL), ZABIK (ME) and GRAY (JI). Fractionated edible beef tallow as a deep-fat frying medium for French fries. *J. Food Sci.* 46(2); 1981; 452-6

3035 BUSSEY (DM), RYAN (TC), GRAY (JI) and ZABIK (ME). Fractionation and characterization of edible tallow. *J. Food Sci.* 46(2); 1981; 526-30

3036 JAY (JM) and MARGITIC (S). Incidence of yeasts in fresh ground beef and their ratios to bacteria. *J. Food Sci.* 46(2); 1981; 648-9

3037 ANELLIS (A), ROWLEY (DB) and ROSS (EW) Jr. Microbiological safety of radappertized beef. *J. Food Prot.* 42(12); 1979; 927-32, 935

Studies with inoculated packs showed that an inoculated pack of beef had only one significant partial spoilage "point" at 22 k Gy. Therefore, the binomial confidence limit was used to compute a 12 D dose of 41.2 k Gy. This 12 D dose, together with a previous thermal treatment to inactivate autolytic enzymes, provides a wide margin of microbiological safety and stability to packaged meats stored without refrigeration. KMD

3038 DeCAMPOS (M), GUTIERREZB (CE) and OLSZYNA-MARZYS (AE). Correlation between total DDT residues in blood and fat of beef animals. *J. Food Prot.* 42(12); 1979; 948-9, 953

Samples of blood and fat from 30 bovines were analyzed by gas liquid chromatography. The "ppm in fat/ppb in blood", ratio was calculated to be 0.96 ± 0.39 (mean + S.D.), the regression line to be Y = 2.54+0.61X (Y=ppb in blood, X=ppm in fat, and the correlation coefficient to be 0.889. It was established that blood analysis may be used to estimate,

before slaughter, whether the residue levels in the fat are in excess of the legal limits. KMD

SHEEP

3039 WHITING (RC), STRANGE (ED), MILLER (AJ), BENEDICT (RC), MOZERSKY (SM) and SWIFT (CE). Effects of electrical stimulation on the functional properties of lamb muscle. *J. Food Sci.* 46(2); 1981; 484-7, 490

Electric stimulation had no large beneficial or detrimental effect on protein functionality, and processing characteristics of lamb muscle. A possible trend was observed towards improved functionality in carcasses chilled more slowly after electrical stimulation. There was however a variation between animals. MVG

3040 STERN (NJ). *Campylobacter fetus* spp. *Jejuni:* Recovery methodology and isolation from lamb carcasses. *J. Food Sci.* 46(2); 1981; 660-1, 663

PORK

3041 VOLLMAR (EK) and MELTON (CC). Selected quality factors and sensory attributes of cured ham as influenced by different phosphate blends. *J. Food Sci.* 46(2); 1981; 317-20, 327

Effects of selected phosphates, alone or in combination, on quality indicators and sensory attributes of ham have been studied. Phosphate treated hams were more acceptable because of less drip loss and higher sensory scores. Sodium triphosphate (STD) alone was not more effective in controlling processing and cooking losses and improving eating quality than blends of STP plus other phosphates. Sodium hexametaphosphate (SHMP), quadrafos (SQ) and tetrasodium pyrophosphate (TSPP) at higher levels were detrimental to processing yield but gave higher palatability scores. None of the phosphates could be considered superior for increasing both yield and eating quality. MVG

3042 BERRY (BW) and BLUMER (TN). Sensory, physical and cooking characteristics of bacon processed with varying levels of sodium nitrite and potassium sorbate. *J. Food Sci.* 46(2); 1981; 321-7

Percent and/or distribution of lean could possibly have better influence on textural, physical and cooking properties of bacon than sodium nitrite-potassium sorbate levels. 40 ppm of sodium nitrite instead of 120 ppm with 2600 ppm potassium sorbate could result in distinctly different aromas during drying and 'chemical' like flavour and aromas during testing, though it could not be known whether the consumers detected them and considered them undesirable. Sodium nitrite appeared to prevent or at least delay the onset of 'microbial' like flavours and aromas in vacuum-packaged bacon. MVG

3043 JOSEFSSON (BGE) and MOLLER (TE). Heat stability of ochratoxin A in pig products. *J. Sci. Food Agric.* 31(12); 1980; 1313-5

Swedish blood-pudding, kidneys, muscular tissue and adipose tissue from pigs, naturally contaminated with ochratoxin A, were analysed for ochratoxin A before and after cooking. Frying temperatures were 150-160 C. On average about 20% of the toxin was lost during cooking. In

the adipose tissue no toxin was lost. AA

5044 CHYR (CY), WALKER (HW) and SEBRANEK (JG). Bacteria associated with spoilage of braunschweiger. *J. Food Sci.* 46(2); 1981; 468-70, 474

FRANKFURTER

5045 BITTEL (RJ), GRAHAM (PP) and BOVARD (KP). Use of mechanically separated spleen in frankfurters *J. Food Sci.* 46(2); 1981; 357-63

SAUSAGE

5046 ANON. The modern sausage. *Br. Food J.* 82(895); 1980; 38-9
Describes the emulsion - type sausage - its technicalities, complexities, variety and manufacture. KAR

5047 HOLLEY (RA) and MILLARD (GE). Ultraviolet spectrophotometric determination of sorbic acid in dry fermented sausage. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1332-5

CHICKEN

5048 SUZUKI (E), MATSUDA (M), MOMOSE (A) and NAMEKATA (M). Improved method for gas-liquid chromatographic determination of clopidol in chicken tissues. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1211-4

5049 THOMSON (JE), BAILEY (JS), COX (NA), POSEY (DA) and CARSON (MO). *Salmonella* on broiler carcasses as affected by fresh water input rate and chlorination of chiller water. *J. Food Prot.* 42(12); 1979; 954-5, 967
Broiler carcasses, each inoculated with about 1000 cells of a marker strain of *Salmonella typhimurium*, or uninoculated, were prechilled and chilled in a simulated commercial process. For each experiments, fresh water input was either 1.9 l or 0.95 l per carcass, and the chlorine level was 0, 20, or 50 ppm. The rate of fresh water input had no significant effect on either cross contamination or elimination of *Salmonella* from the inoculated carcasses. Cross contamination was decreased, but not eliminated, by using 50 ppm chlorine in the water. The chlorine content of chilled water decreased rapidly due to the effect of organic matter. KMD

EGG

5050 RAYNER (ET), DUPUY (HP), LEGENDRE (MG), SCHULLER (WH) and HOLBROOK (DM). Assessment of egg flavour (odour) quality by unconventional gas chromatography. *Poult. Sci.* 59(10); 1980; 2348-51

5051 ISHIDA (M), SUYAMA (K) and ADACHI (S). Occurrence of dibutyl and di(2-ethylhexyl)phthalate in chicken eggs. *J. Agric. Food Chem.* 29(1); 1981; 72-4
Chicken eggs collected from retail stores in Japan in the year 1977,

showed very low levels of dibutyl phthalate (DBP) and di(2-ethylhexyl) phthalate (DEHP), where as in egg white, these were in the range of trace to 0.15 ppm and 0.05 to 0.40 ppm respectively. Egg yolk did not, however, show the presence of phthalates. Administration of DEHP to laying hens resulted in contamination of resulting eggs with this phthalate. BSN

3052 GOSSETT (PW) and BAKER (RC). Prevention of the green gray discolouration in cooked liquid whole eggs. *J. Food Sci.* 46(2); 1981; 328-31

Acidic chelating agents added to raw liquid whole egg at pH samples could prevent green-gray discolouration in cooked eggs. Concentrations which successfully prevented discolouration at p = 0.05 were : acetic acid 0.19%; citric acid 0.17%; Na_2EDTA 0.029%, lactic acid 0.27%; malic acid 0.22%; monosodium phosphate 0.34% propionic acid 0.26% and succinic acid 0.27%. It was also shown that raw liquid whole eggs stored at 3 C for 21 days had an average pH of 7.93 $\pm$ 0.19. Na_2EDTA and monosodium phosphate treated product had the same overall acceptability as the controls. Similarly, citric acid treatment gave a product with flavour acceptability similar to that of controls. MVG

SEAFOODS

3053 KOBURGER (JA) and WAHLQUIST (CL). Identification of Enterobacteriaceae isolated from seafoods. *J. Food Prot.* 42(12); 1979; 956-7

3054 LISTON (J). Health and safety of seafoods. *Food Technol. Aust.* 32(9); 1980; 428-30, 432, 434, 436

The various types of toxins covered include: bacterial poisoning, botulism, and scombroid, fish poisoning like puffer fish, ciguatera and paralytic shell fish poisoning, anaskid worms and pollutants. KAR

FISH

3055 NIMURA (Y). A new filter feeding model incorporating the critical food concentration. *Bull. Jap. Soc. Sci. Fish.* 46(7); 1980; 787-95

A new set of equations was developed to describe the filter feeding process, incorporating the critical food density at which the rate-limiting process changed. The set composed of two groups of equations; one for the process below the critical density and the other for that above the density. Though the former has already been used, the latter is new one. By the case study adopting the present model, the critical density estimated by the change in filtering rate was found to be usually lower than that by the change in ingestion rate. KAR

3056 YAMANAKA (H), SHIOMI (K), NAITO (M) and KIKUCHI (T). Histamine content in the canned red meat fish. *Bull. Jap. Soc. Sci. Fish.* 46(7); 1980; 905-7 (Japanese)

Histamine content which became high with the lowering of quality of canned meat cannot be considered for quality of canned albacore and skip jack. The hypoxanthine ratio was found to be better quality index. Histamine content of canned albacore, skipjack, mackerel, sardine and saury pike is reported. KAR

3057 COLLETT (DL), FLEMING (DE) and TAYLOR (GA). Determination of alkyl-mercury in fish by steam distillation and cold-vapour atomic-absorption spectrophotometry. *Analyst.* 105(1254); 1980; 897-901

The method consists of digestion of fish sample in alkali, acidification, addition of copper (II) ion and steam distillation of alkyl mercury into a potassium persulphate absorbing medium. Mercury, after conversion into organic form is determined by atomic-absorption spectrophotometry. BSN

3058 AGEMIAN (H) and THOMSON (R). Simple semi-automated atomic-absorption spectrometric method for the determination of arsenic and selenium in fish tissue. *Analyst.* 105(1254); 1980; 902-7

The simple and safe digestion method developed for simultaneous extraction of arsenic and selenium from fish tissue involves the use of a combination of nitric, perchloric and sulphuric acids to dissolve completely resistant high fat tissue at high temperatures without volatilisation losses. Digestion of fish samples is accomplished by placing them in test tubes placed in an aluminium hot block. Automatic analysis of extracts is done by reduction with sodium tetrahydroborate (III), followed by atomic absorption spectrometry with quartz tube atomisation. The recovery was found satisfactory when applied to several organoarsenic and organoselenium fish species. BSN

3059 DURR (F), KOSSUROK (B) and SCHOBER (B). On the occurrence of biogenic amines in raw fish and fried products. *Lebensmittel-Industrie.* 27(6); 1980; 253-8 (German)

Raw fish and fried fish in spicy brine made of herring, mackerel, horse mackerel, sardine and capelin, were prepared and stored under different conditions and the occurrence of biogenic amines was observed. In all fish species, except herring, histamine was detected. The load was the heaviest in sardines and highest in horse mackerel. At temperatures above 15 C, the formation of histamine began in fried fish partially before the sensoric spoilage and its amount exceeded 300 mg/kg within one day after the first detection. The quality of the raw fish, addition of the brine, and the acid content, besides the storage temperature exert significant influence on the formation of histamine. Other biogenic amines could not be detected. Histamine formed in the fish was hardly destroyed by sterilization. AA

3060 WEST (SD) and BURGER (RO). Gas chromatographic determination of fluridone aquatic herbicide and its major metabolite in fish. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1304-9

3061 KUEHL (DW), LEONARD (DN), WELCH (KJ) and VEITH (GD). Identification of hazardous organic chemicals in fish from the Ashtabula river, Ohio and Wabash river, Indiana. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1238-44

Composite fish samples from the Wabash River, IN, and the Ashtabula River, OH were analyzed by conventional pesticide procedures for PCBs, DDTs, chlordane components, and hexachlorobenzene. Additional aliquots of each sample were processed by gel permeation chromatography and were analyzed with gas chromatography - mass spectrometry by using both electron impact and negative chemical ionization modes. These analyses resulted in the identification of a series of chlorinated alkanes, chlorinated alkenes, chlorinated alkylamines containing 2-5 carbons, and

polychlorinated styrenes in the Ashtabula River sample, and a series of chlorinated norbornenes, pentachlorobenzyl alcohol, and pentachlorophenol in the Wabash River sample.

3062 CHUNGATH (JP), GOPAKUMAR (K), VASANTHA SHENOY (A) and THANKAMMA (R). Nutritional Evaluation of an indigenous low cost protein food. *Fish. Technol.* 17(2); 1980; 95-7

Edible fish powder prepared out of lean fish meat was determined for proximate and amino acid compositions, 'Chutney' (a type of sauce) was prepared by mixing fish powder (1 kg) with onion (800 g), coconut (400 g), salt, chilli and ginger to taste and grinding the mixture to a paste. Children (75) were fed 40 g each of the 'chutney' (containing 20 g protein) with two slices of bread or a few pieces of cooked cassava once a day for 35 days as supplementary food. The nutritional status was assessed at 10. 20, 30 and 35th day by recording the body weight and mid-arm circumferance. Significant weight gain and increase in mid-term circumference occurred in 35% and 48% of the children respectively Results indicate that the PER . of the fish powder was 3.1 as compared to casein (2.46). Loss of lysine on heating was least in fish powder when compared with milk, groundnut or wheat. Its acceptance by the children, was excellent. The cost of pilot-scale production worked out to Rs. 7/kg. MVG

3063 MUNKNER (W), HARWARDT (I), PETERSEN (J) and WAGENKNECHT (W). About the utilization of the fresh-water fish species of Roach (*Rutilus rutilus* L.). Bream (*Abralis brama* L.) and Perch (*Perca fluviatilis* L.) Part I. Present status Part II. Investigating new possibilities of processing. *Lebensmittel-Industrie.* 27(6); 1980; 251-2; 27(7); 1980; 317-24 (German)

The application of the fresh water fish species of roach, bream and perch in larger quantities in the processing industry and for supply will be possible by use of new methods and processes like processing and utilization of fish meat. The production of fish mince offers good possibilities of using these fresh water fish species for human consumption. This way the problems regarding fish bones and scales are solved and the fish is processed to semi-finished products like frozen fish mince, fish meat and salted mince. Fresh and frozen raw products are suitable for different purposes. KMD

3064 BADONIA (R) and DEVADASAN (K). Frozen storage characteristics of ribbon fish. *Fish Technol.* 17(2); 1980; 125-6

Ribbon fish (Trichiurus sp.) were frozen as (i) chunks (20 cm length) in blocks (1 kg each), or (ii) after individually wrapping in polythene as blocks (1 kg each) or (iii) after mincing at -40 C and storage at -18 C. The changes during freezing were similar to those in other marine fishes. Freezing (i) or (ii) was found to be the best method, as the fish retained its uality upto 16 weeks and was acceptable upto 28 weeks. (iii) was acceptable only upto 12 weeks after which it deteriorated markedly. MVG

SHARK

3065 CHARI (ST) and SREENIVASAN (A). Protein concentrate from shark. *Fish. Technol.* 17(2); 1980;.155-7

Fish protein concentrate (FPC) was prepared by leaching the minced muscle in water, cooking, pressing, drying and powdering. The PFC contained 87.60% protein and free from urea. The product has a balanced essential amino acid composition. The FPC kept well for one year without any deterioration in odour and flavour. Longer period of storage could be achieved by use of air tight storage method coupled with low moisture and fat content. The FPC could be used for fortification of bread, biscuits and chapathis at 10, 5 and 2% levels respectively. MVG

066 YAMAMOTO (M) and MACKEY (J). Enzymatic method for reducing curd formation in canned salmon. *J. Food Sci.* 46(2); 1981; 656-7

TUNA

067 MURALEEDHARAN (V) and VALSAN (AP). Preparation of Masmin - an improved method. *Fish Technol.* 17(2); 1980; 99-101

An improved method for the preparation of 'Masmin' the traditional smoked tuna of the Lakshadweep Islands has been outlined. Fillets of fresh of tuna (*Euthynnus affinis*) were cut lengthwise (5 cm thickness, 15 cm length) washed in water, dipped in saturated brine (1 kg: 1 ℓ) for 30 minutes and exposed to steam for 1 hour sun dried to about 40% moisture and smoked for 4 hours, till the development of glossy appearance, brown colour and smoky flavour. The smoked strips were dried to 10% moisture. The new product contained less NaCl (1.6%) more of amino N (0.5702%) and had improved digestibility of N. MVG

SHELL FISH

068 SHOPTAUGH (NH), CARTER (PW), FOXALL (TL), SASNER (JJ) Jr. and IKAWA (M). Use of fluorometry for the determination of *Gonyaulax tamarensis* var. *excavata* toxins in New England shellfish. *J. Agric. Food Chem.* 29(1); 1981; 198-200

069 TOM (RA) and CARROAD (PA). Effect of reaction conditions of hydrolysis of chitin by *Serratia marcescens* QMB 1466 chitinase. *J. Food Sci.* 46(2); 1981; 646-7

The hydrolysis of chitin by *Serratia marcescens* chitinase was studied as part of an overall project to develop a chitin waste treatment bioconversion scheme. Hydrolysis were conducted with automatic pH control in stirred flasks. Parameters varied were temperature, enzyme activity, and chitin particle size and concentration. A temperature of 30 C is suitable. Hydrolysis increases with increasing enzyme activity and chitin slurry concentration, and with decreasing particle size. AA

70 ADAMS (WN) and MIESCIER (JJ). Commentary of AOAC method for paralytic shellfish poisoning. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1336-43

PRAWN

71 MULBAGAL (AN), MAHAJAN (SN) and RANADE (AM). Preparation of edible powder from Jawla (*Acetes* Sp.) prawns. *Fish. Technol.* 17(2); 1980; 127-8

Edible powder from Jawla (*Acetes* Sp.) prawns were prepared by four methods (i) washing fresh prawns with potable water to remove slime and dirt; spreading in thin layers and dried at 40 C for 24-28 hours in a hot oven; and pulverised in a table mill and sieved using a sieve of 3600 meshed/sq in., (ii) washing prawns and oven dried at 60 C for 8-10 hours; and pulverised to a fine powder, (iii) washing beheaded prawns and oven drying at 40 C for 24-28 hours and powdered, (iv) oven drying sun-dried prawns obtained from the market at 40 C for 4-6 hours and powdered, (i) gave good quality powder followed by (ii), (iii) gave good product, but beheading was time consuming with lesser yield. In (iv) the product contained high counts of viable bacteria and coliforms. Powders from (i) and (ii) could be satisfactorily used to prepare a variety of dishes. MVG

3072 REDDY (SK), NIP (WK) and TANG (CS). Changes in fatty acids and sensory quality of fresh water prawn (*Macrobrachium rosenbergii*) stored under frozen conditions. *J. Food Sci.* 46(2); 1981; 353-6

Fresh prawns contained lipids with 23% saturated, 46% monounsaturated, and 31% polyunsaturated fatty acids. During frozen storage at -18 C for 6 months, the fatty acids particularly, unsaturated ones decreased irrespective of packaging method used. However, no objectionable rancid flavours were detected in these prawns during the storage study. MVG

LOBSTER

3073 LAMPRECHT (EC). Survival of *Vibrio parahaemolyticus* during freezing. *J. Sci. Food Agric.* 31(12); 1980; 1309-12

The ability of *Vibrio parahaemolyticus* to survive on frozen rock lobster tails was investigated. Rock lobster tails were artificially inoculated with the organism and were stored at -18 C. Vibrio died off within 1 week at -18 C in lightly contaiminated tails, but a heavy infection survived for a few months at this temperature. Recovery depended on the degree of infection, the presence of other bacteria and the selectivity of the medium. AA

CRAB

3074 RADHAKRISHNAN (CK) and SAMUEL (CT). Prospects of fishery, utilisation and culture of crabs in India. *Fish. Technol.* 17(2); 1980; 67-9

This brief review covers nutritive value and utilisation of crab meat. MVG

3075 HAYASHI (T), YAMAGUCHI (K) and KONOSU (S). Sensory analysis of taste-active components in the extract of boiled snow crab meat. *J. Food Sci.* 46(2); 1981; 479-83, 493

A synthetic simulated crab meat prepared from 44 pure chemicals satisfactorily reproduced the taste of boiled snow crab (*Chionoecetes opilio*) except for a slight lack of body and mildness. It was found that the nucleus of the taste of boiled snow crab meat can be constructed by Arg; Glu, Gly, AMP, Na^+ and Cl^- and elaborated by Ala, CMP, glycine

betaine, K^+ and PO_4^{3-}. The characteristics taste produced by the above is intensified by the presence of other extractive components. MVG

SQUID

3076 VARMA (PRG) and JOSEPH (J). Canning of squid. *Fish. Technol.* 17(2); 1980; 93-4

The process for canning of squid (*Loligo* sp.) was fried by blanching dressed squid in 7% brine containing 0.2% citric acid for 3, 5 and 7 minutes. The blanching time of 5 minutes was found optimum. The blanched meat was packed, filled with 2% brining containing 0.2% citric acid and processed at 1.0 kg/cm^2 steam for 20 minutes. Addition of citric acid prevented blackening of canned squid up to a storage period of 12 months. The canned product had excellent organoleptic quality and the life. MVG

SHRIMP

3077 SRINIVASA GOPAL (TK) and GOVINDAN (TK). Survey of the properties of master cartons (Corrugated fibre board boxes used in frozen shrimp industry). *Fish. Technol.* 17(2); 1980; 103-6

Master cartons used for fishery products were collected from different prawn freezing factories and assessed for bursting strength, puncture resistance, water proofness, tearing strength, elongation, moisture content, thickness, weight of carton, wax content and saponifiable matter. and their conformity to ISI standards. Results showed that the cartons from different manufacturers varied widely in mechanical and chemical parameters and that only 9.4% conformed to ISI standards. MVG

3078 SRINIVASA GOPAL (TK) and GOVINDAN (TK). Survey of the properties of waxed duplex cartons used in frozen shrimp industry. *Fish. Technol.* 17(2); 1980; 107-10

Waxed duplex cartons collected from different prawn freezing factories were evaluated for physico-chemical properties such as bursting strength, puncture resistance water proofness, tearing strength, tensile strength, elongation, moisture content, thickness, weight of the carton, dimension, wax content and saponifiable matter. The results are discussed from the point of view of formulation of standards for this most widely employed packaging material for frozen fishery products in the country. MVG

3079 TENHET (V), FINNE (G), NICKELSON (R), II and TOLODAY (D). Penetration of sodium tripolyphosphate into fresh and prefrozen peeled and deveined shrimp. *J. Food Sci.* 46(2); 1981; 344-9

Distribution of sodium tripolyphosphate (STP) in treated shrimp was studied using p^{32} labeled STP. Concentrations used were either 0.5%, 1%, 5% or 10% and duration of the treatment was either 20 seconds, 1 minute, 5 minutes or 20 minutes with 0.5%, and 1%. STP, a phosphate concentration gradient was evident in the muscle, STP accumulating on the muscle surface preventing further STP uptake. At higher STP concentrations, prolonged treatments resulted in equal distribution of STP in the muscle (4.8 mm) overcoming the concentration gradients. Fresh and prefrozen shrimp had the same penetration mechanism. MVG

3080 TENHET (V), FINNE (G), NICKELSON (R) II and TOLODAY (D). Phosphorous levels in peeled and deveined shrimp treated with sodium tripolyphosphate. *J. Food Sci.* 46(2); 1981; 350-2, 356

Untreated shrimp was shown to contain high and variable phosphorus content. Sodium triphosphate (STP) uptake was low in peeled and deveined shrimp when treated with 0.5% and 1.0% solutions of STP, and the treated shrimp could not be identified. With higher concentrations treated shrimp could be identified. Due to STP breakdown during treatment and frozen storage, it is not possible to determine STP in shrimp unless treatted at high concentrations. MVG

OYSTER

3081 PEIXOTTO (SS), FINNE (G), HANNA (MO) and VANDERZANT (C). Presence. growth and survival of *Yersinia enterocolitica* in oysters, shrimp and crab. *J. Food Sci.* 42(12); 1979; 974-81

FROG

3082 GOPALAKRISHNA IYER (TS) and JOSEPH (AC). Isolation of *Salmonella roan* for the first time in India. *Fish Technol.* 17(2); 1981; 123

A new serotype *Salmanella roan* has been isolated from a sample of frozen frog legs collected from Cochin market. It has the biochemical properties similar to typical *Salmonella.* MVG

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

FRUIT JUICES

GRAPE

3083 MORRIS (JR), CAWTHON (DL) and FLEMING (JW). Effects of high rates of potassium fertilization on raw product quality and changes in pH and acidity during storage of concord grape juice. *Am. J. Enol. Vitic.* 31(4); 1980; 323-8

Administration of excessive levels of potassium (K) fertilizer (225-900 kg/ha) applied to concord grape wine yard for five years, resulted among other developments, in increase of K, and pH levels and decrease of titratable acidity values. During juice storage with high K content, significant increase in pH and acidity losses were observed. Tristimulus colour values got reduced and a reduction in the amount of green fruit present at the time of harvest was observed. BSN

ORANGE

3084 PETRUS (DR) and ATTAWAY (JA). Visible and ultraviolet absorption and fluorescence excitation and emission characteristics of florida orange juice and orange pulpwash: Detection of adulteration. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1317-31

PEAR

3085 CORNWELL (CJ) and WROLSTAD (RE). Causes of browning in pear juice concentrate during storage. *J. Food Sci.* 46(2); 1981; 515-8

Pear juice was treated with cation exchange resin, PVPP, XAD-4, oxygen and various resin combinations, Samples were concentrated and increases in browning measured during storage at 37 C. Analytical determinations included α-amino nitrogen, total phenolics, metal ions, ascorbic acid, and dehydroascorbic acid. While XAD-4 and PVPP were more effective in lowering phenolic content and reducing initial colour, cation exchange treatment removed amino acids and was most effective in preventing browning and providing flavour stability. Addition of glycine to cation-exchange treated samples restored browning rates. Reductone formation during storage resulted in an apparent increase in ascorbic acid. It was concluded that Maillard browning reactions predominated during storage. AA

SOFT DRINK

3086 KRUGER (G). Quantitative analysis of saccharine and cyclamate in soft drinks. *Lebensmittel-Industrie.* 27(6); 1980; 264-6 (German)

TEA

3087 LITTLE (AC) and BRINNER (L). Optical properties of instant tea and coffee solutions. *J. Food Sci.* 46(2); 1981; 519-22, 525

COFFEE

3088 LEVI (C). Mycotoxins in coffee. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1282-5

COCOA

3089 LEHRIAN (DW) and KEENEY (PG). Changes in lipid components of seeds during growth and ripening of cocoa fruits. *J. Am. Oil Chem. Soc.* 57(2); 1980; 61-5

3090 LEHRIAN (DW), KEENEY (PG) and BUTLER (DR). Triglyceride characteristics of cocoa butter from cocoa fruit matured in a microclimate of elevated temperature. *J. Am. Oil Chem. Soc.* 57(2); 1980; 66-9

3091 BROSIO (E), CONTI (F), DI NOLA (A) and SYKORA (S). A pulsed low resolution NMR study on crystallization and melting processes of cocoa butter. *J. Am. Oil Chem. Soc.* 57(2); 1980; 78-82

3092 LENOVICH (LM). Effect of caffeine on aflatoxin production on cocoa beans. *J. Food Sci.* 46(2); 1981; 655-7

The effects of caffeine on aflatoxin production by *Aspergillus parasiticus* NRRL 2999 were studied on 13 cocoa bean types. Caffeine levels from bean types ranged from 0.30-3.6 mg/g and only very low levels of aflatoxin were produced on bean types having >1,80 mg caffeine/g. These data provide additional evidence that caffeine is an effective inhibitor of aflatoxin production and help explain whey aflatoxin does not accumulate in cocoa beans under natural storage conditions. AA

3093 ETIEVANT (PX). Volatile phenol determination in wine. *J. Agric. Food Chem.* 29(1); 1981; 65-7

Employing exchange chromatography, GC and combined capillary GC-MS twelve volatile phenols (2-methoxyphenol, phenol, o-cresol, 4-ethyl-2-methoxyphenol, 2-ethylphenol, p-cresol, m-cresol, 4-ethylphenol,2-methoxy-4 vinylphenol, 4-vinylphenol, acetovanillone- and propiovanillone) were identified in 'corbieres' red wine on storage without contact with wood. BSN

3094 CARNACINI (AB), CAPELLA (P) and AMATI (A). Volatile components of Albana wine. IV. Hydroxy compounds. *Am. J. Enol. Vitic.* 31(4); 1981; 313-5

Hydroxy compounds present in the volatile concentrate of Albana wine were assayed by GC-MS for preparation of corresponding p-nitrobenzoates and after isolation of the alcohols of TLC. By GC-MS studies, twenty two alcohols and hydroxyesters were identified. Of them, for the first time, ethyl-9-hydroxynonanoate, ethyl-11-hydroxyundecanoate, methyl-3-hydroxycaproate and ethyl-3-hydroxycaprate have been reported. BSN

3095 RADVANYI (J) Jr., STOJANOVIC (BJ), DRAPALA (WJ), OVERCASH (JP) and HEGWOOD (CP) Jr. Composition and quality of juices and wines of eight *Vitis rotundifolia* Michx. Cultivars. *Am. J. Enol. Vitic.* 31(4); 1980; 316-22

Soluble solids ranged from 12.8-19.8° Brix in grape juices during the two-year (1975-76) period. Total acid content varied mainly with cultivar and to a lesser extent with the year of harvest (in 1975, 0.34 - 0.83% and in 1976, 0.38-0.88%) Tannins were within limits for bunch grapes (0.0-0.2%). Fe and Cu were found in solid fraction of juices, while six cations (Ca, Mg, K, Na, Mn and Zn) were found in non-solid portion of juice, Grape wines had an average pH of 3.22 and showed total acid of 0.71%, volatile acid, 37 mg/100 mL, fixed acids 0.68%, ethanol (by volume), 11.9% and methanol 46 mg/mL). Total phenol content of red wines was about thrice as compared to white wine. Wines showed a natural light golden colour as examined by tristimulus colour description. Sensory evaluation results indicated that wines with higher residual sugar content were preferred by majority of panelists. BSN

3096 SLINGSBY (RW), KEPNER (RE), MULLER (CJ), DINSMOOR WEBB (A). Some volatile components of *Vitis vinifera* variety cabernet sauvignon wine. *Am. J. Enol. Vitic.* 31(4); 1980; 360-3

Of the forty compounds isolated and identified from Monterey county cabernet sauvignon wine of intense aroma by GC, coupled GC-MS and Kovats indices, the more important were: *Cis*-2-hexen-1-ol, *Cis*-3-hexen-1-ol, styrene, phenylacetaldehyde, ethyl furoate, diethyl maleate, diethylmalonate, 1,1,6-trimethyl-1, 2-dihydronapthalene and ethyl cinnamate, 2-methoxy-3-isobutyl pyrazine was not found either in the wine or in the extracts made strongly basic and reextracted. BSN

3097 DAUDT (CE) and OUGH (CS). A method for detecting volatile amines in grapes and wines. *Am. J. Enol. Vitic.* 31(4); 1980; 356-9

A method for determining amines is given. The method involves double vacuum distillation, derivatizing with trifluoroacetic anhydride, extraction with ether after sodium bicarbonate wash, and gas chromatography of the sample in a gas chromatograph (GC) equipped with a nitrogen detector. Recovery and reproducibility studies are shown. Examples of gas chromatographic-mass spectra (GC-MS) and data of retention times are given. The sensitivity of the method is demonstrated by chromatograms of Cabernet Sauvignon, Pinot noir, White Riesling, and Carmine that show the presence of some amines positively identified, some tentatively identified, and some as yet unknown.

3098 OUGH (CS) and CROWELL (EA). Nitrate determination in California musts and wines. *Am. J. Enol. Vitic.* 31(4); 1980; 344-6

The slightly modified chemical nitrate method involves substitution of N-1-naphthylethylene diamine for α-naphthylamine as the colour reagent. White table wines and red wines showed 2.1-53.7 mg/L of NO_3 (average 16.4 mg/L of NO_3) and 0.9-41.4 mg/L of NO_3 (average 8.5 mg/L of NO_3) respectively. BSN

3099 MATTICK (LR), PLANE((RA) and WEIRS (DL). Lowering wine acidity with carbonates. *Am. J. Enol. Vitic.* 31(4); 1980; 350-5

For deacidification of wines with $KHCO_3$, the pH of grape must should be below 3.0 if the titratable acidity is above 10g/L for $KHCO_3$. The slurry method of $CaCO_3$ addition does not result in as high a residual Ca concentration as by direct method. For wines having malate in excess of 4g/L, malolactic fermentation may be the preferred method for deacidification. BSN

3100 SUBDEN (RE), CORNELL (R) and NOBLE (AC). Evaluation of API 20 C clinical yeast identification system for must and wine yeast identification. *Am. J. Enol. Vitic.* 31(4); 1980; 364-6

3101 QUINSLAND (D). Fill volume measurements of bottled wine. *Am. J. Enol. Vitic.* 32(1); 1981; 86

3102 DUITSCHAEVER (CL), BUTEAU (C) and ASHTON (GC). Edulcoration of white wine with four different sweeteners. *Am. J. Enol. Vitic.* 31(4); 1980; 337-43

Sweeteners (Seyval Blanc or Elvira or catawba grape juice reserve, granular glucose and liquid invert sugar) were edulcorated with seyval Blanc and Elvira grape wines. Sensory evaluation showed that although edulcoration improved overall quality of wines. Judges failed to discriminate between the two types of grape juice reserve. However, grape juice reserve was preferred to either glucose or invert sugar. BSN

3103 HAVERY (DC), HOTCHKISS (JH) and FAZIO (T). Nitrosamines in malt and malt beverages. *J. Food Sci.* 46(2); 1981; 501-5

National and local surveys of barley malt and barley malt-containing beverages of volatile N-nitrosamines were conducted by the Food and Drug Administration. Sixty-four samples of locally purchased beers had an average N-nitrosodimethylamine (NDMA) content of 3 ppb. Eleven of 44 Scotch whiskeys had nondetectable NDMA levels. A national sampling of domestic and imported malts revealed that 84% had NDMA concentrations of less than 10 ppb. Domestic and imported beers were also surveyed in a compliance program; 260 beer samples (180 domestic, 80 import) were analyzed. The domestic beers averaged less than 1 ppb and the imported beers averaged 1 ppb. These data indicate that the levels of NDMA in beer have been reduced significantly. AA

OILS AND FATS

3104 PARADIS (AJ) and NAWAR (WW). Evaluation of new methods for the assessment of used frying oils. *J. Food Sci.* 46(2); 1981; 449-51

The methods compared were: column chromatography of polar components, dielectric constant measurement and GLC of triglyceride dimers. Correlations in frying time between the methods existed for a given frying operation with samples of unknown history, large differences were encountered. The dielectric readings represented a net balance of opposing efforts from two groups of compounds. GLC method was simpler and more specific than column chromatography. MVG

3105 FIDDLER (W), PENSABENE (JW) and KIMOTO (WI). Investigations of edible oils for volatile nitrosamines. *J. Food Sci.* 46(2); 1981; 603-5

Twenty-one commercial edible oils and five margarine samples were purchased locally and analyzed for nitrosamines (NAs) by a gas-liquid chromatograph interfaced with a Thermal Energy Analyzer. N-nitrosodimethylamine (NDMA), at levels of 0.22-1.01 ppb, was the only volatile apparent NA detected. These levels were found in 7/7 corn, 6/6 olive, 2/2 sunflower, 1/3 soyabean, 2/3 undesignated oils, and 4/5 margarine samples. The other three oils and one margarine sample showed no NDMA at the lower limit of 0.1 ppb. These levels of nitrosamine detected in the edible oils tested were much lower than the levels previously reported. AA

3106 HUQ (MS) and RUBBI (SF). Effect of processings of oilcakes and their residual oils. *Bangladesh J. Sci. Ind. Res.* 15(1-4); 1980; 89-95

3107 HELME (JP). Influence of techniques on the quality of food products in the fats and oil industry. Part I, II and III. *Oleagineux.* 34(12); 1979; 591-600; 35(1); 1980; 37-45 and 35(2); 1980; 93-103

After a brief description of the chemical reactions on triglycerides e.g., ester and hydroxyl groups, double linkage - the authors have dealt with the structure of the food fats and oils industry, the various raw materials and techniques used, and the products made. Important analytical methods for a strict and precise quality control are then presented.

The quality of the products have been studied from 4 main angles: (i) nutritional (i.e. biochemical and toxicological) (ii) acceptability to the housewife; (iii) legislation; and (iv) physical, chemical, and physico-chemical standards. Finally, the effects which the technology of fats can have on quality, and the methods by which problems can be overcome when they arise, have been discussed. KMD

3108 YAMAZAKI (M), NAGAO (A) and KOMAMIYA (K). High pressure differential thermal analysis (HPDTA) of fatty acid methyl esters and triglycerides. *J. Am. Oil Chem. Soc.* 57(2); 1980; 59-60

3109 VICKERY (JR). The fatty acid composition of seed oils from ten plant families with particular reference to cyclopropene and dihydrosterculic acids. *J. Am. Oil Chem. Soc.* 57(2); 1980; 87-91

3110 DOEDEN (WG), KUSHIBAB (EM) and INGALA (AC). Determination of dimethylpolysiloxanes in fats and oils. *J. Am. Oil. Chem. Soc.* 57(2); 1980; 73-4

A direct aspiration flame atomic absorption method has been developed for the determination of dimethylpolysiloxanes (DMPS) in fats and oils. The detection limit of the method is approximately 1 ppm with a standard deviation of 0.3 samples containing 1-10 ppm (DMPS). The technique is reasonably rapid, requires a minimum of sample preparation, and is applicable to the analysis of both hydrogenated and nonhydrogenated products. AA

SPICES AND CONDIMENTS

3111 ILYAS (M). Spices in India. III. *Econ. Bot.* 34(3); 1980; 236-59

Covers coriander, cumin, a caraway, fennel, carum, dill, celery, aniseed and star anise. KAR

CAPSICUM

3112 BAJAJ (KL). Colorimetric determination of capsaicin in capsicum uits. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1314-6

PEPPER

3113 SU (HCF) and HORVAT (R). Isolation, identification and insecticidal properties of *Piper nigrum* amides. *J. Agric. Food Chem.* 29(1); 1981; 115-8

Based on spectral characteristics, three amides identified from *Piper nigrum* L. have been described as: (E,E)-N-(2-methyl-propyl)2-, 4-decadienamide(I), (E,E,E)-13-(1,3-benzodioxyl-5yl)-N-(2-,methyl-propyl-2,4-12-tridecatrienamide (II), and (E.E.E)-11 (1,3-benzodioxol 5-yl-N-(2-methylpropyl)2-4,10, undecatrienamide (III). Against *Callosobruchus maculatus* (F), the topical LD_{50} values of I, II and III compounds were 2.18, 0.25 and 0.84 µg/insect for males (weight 3.8-5.7 mg) and 6.70,1.43 and 3.88 µg/insect for females (weight 5.4-7.9 mg), respectively. BSN

CINNAMON

3114 HOFFMAN (PG) and SALB (MC). Radiocarbon (14_C) method for authenticating natural cinnamic aldehyde. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1181-3

SENSORY EVALUATION

3115 KATZ (EE) and LABUZA (TP). Effect of water activity on the sensory crispness and mechanical deformation of snack food products. *J. Food Sci.* 46(2); 1981; 403-9

Intensity of crispness and overall hedonic texture of dry snack products (potato chips, popcorn, puffed corn curls and saltines) were found to be a function of a_w. Sensory acceptability decreased with increased a_w. Critical water activities (a_c) were found in sensorily unacceptable products and fell in the 0.35-0.50 a_w range. Force-deformation curve (as per instron analyser) changed near a_c for saltiness and puffed corn curls. For popcorn, it changed more gradually. Generally, compared to mechanical analyses, sensory analysis was found to be a better determinant of the degree of crispness intensity. With increasing a_w no consistant force-deformation curve was noticed in potato chips. Cohesiveness value of popcorn was a good indicator of its sensory crispness. MVG

3116 CHRISTENSEN (CM) and VICKERS (ZM). Relationship of chewing sounds to judgements of food crispness. *J. Food Sci.* 46(2); 1981; 574-8

Two experiments were performed with trained subjects to find out the relationships between biting and chewing sounds and judgements of food crispness. In the first experiment, magnitude estimation was used to judge separately the loudness of chewing sounds and the crispness of a variety of wet and dry crisp foods. Perceived crispness and loudness were highly correlated both on fracture by single bit as and when further broken down by chewing. In the second experiment, though the sounds were blocked by a loud masking noise, the subjects were able to determine crispness. High correlations were obtained between crisp judgements obtained in the two experiments. It was concluded that the vibrations produced by fracturing during chewing may underline the crispness perception. MVG

3117 TRANT (AS), PANGBORN (RM) and LITTLE (AC). Potential fallacy of correlating hedonic responses with physical and chemical measurements. *J. Food Sci.* 46(2); 1981; 583-8

Perceived intensity (strength) and hedonic responses (like/dislike) from 29 judges were assessed in 3 sensory systems, namely, colour in orange juice, oral viscosity of apricot nectar, and sweetness in lemonade and compared with results of instrumental analysis. (Hunger, values for orange juice, Brookfield, viscosity at 30 rpm for apricot nectar and refractive index for lemonade). The studies show the necessity of separating intensity from hedonic judgements. Though both remained stable over the 7 week study, only intensity could be logically related to instrumental analysis by linear correlation. MVG

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

3118 JACKSON (WB). Rodent behaviour. *Cereal Food World.* 25(12); 1980; 746-7

The need for understanding the rodent behaviour by the food plant manager is stressed. KAR

3119 KNOTE (CE). Physical control of rodents. *Cereal Food World.* 25(12); 1980; 748-9

After understanding the characteristics of rodents, the authors describe how rodents could be controlled in holes and entry through doors, outside the building, etc. KAR

3120 FITZWATER (WD). Rodenticides. *Cereal Food World.* 25(12); 1980; 751-3

The aspects covered are types of rodenticides, (acute and chronic toxicants) including baits, problems in control and resistance to rodenticide. KAR

3121 PURUSHOTHAM (KR) and MOHANA RAO (AMK) The distribution of field rodents and their burrowing habits around Tirupati (Andhra Pradesh). *Andhra Agric. J.* 26(3/4); 1979; 85-7

3122 McDOUGALL (KW), Quickfit florisil pesticide trap for use with assisted distillation technique. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1355-6

3123 CARLSTROM (AA). High pressure liquid chromatography of captan in formulations. Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1231-7

3124 ANON. Determination of a range of organophosphorus pesticide residues in grain. *Analyst.* 105(1250); 1980; 515-7

BIOCHEMISTRY AND NUTRITION

3125 SHIMADA (K) and MATSUHITA (S). Effects of salts and denaturants of thermocoagulation of proteins. *J. Agric. Food Chem.* 29(1); 1981; 15-20

3126 ACHOR (IM), RICHARDSON (T) and DRAPER (NR). Effect of treating *Candida utilis* with acid or alkali, to remove nucleic acids, on the quality of the protein. *J. Agric. Food Chem.* 29(1); 1981; 27-33

3127 BUTTERY (RG), SEIFERT (RM), TURNBAUGH (JG), GUADAGNI (DG) and LING (LC). Odour threshold of thiamin odour compound 1-methylbicyclo-(3.3.0)-2,4-dithia-8-oxaoctane. *J. Agric. Food Chem.* 29(1); 1981; 183-5

3128 GRUNDEL (E), O'DELL (RG), PIRISINO (J) and PROSKY (L). Analysis of liquid protein products for amino acids, carbohydrates, and peptides. *J. Agric. Food Chem.* 29(1); 1981; 187-8

3129 DWORSCHAK (E). Nonenzyme browning and its effect on protein nutrition. *CRC Crit. Rev. Food Sci. Nutr.* 13(1); 1980; 1-40

Discusses: determination of nutritive value of proteins(animal experiments, chemical and enzymatic methods) heating of food proteins; description and mechanism of Maillard reaction in amino acid sugar systems; factors influencing Maillard reaction sugars, (amino acids, effect of pH, role of water, heavy metals); reactions of some essential amino acids; Maillard reaction of methionine and biological effect of its oxidation products (Maillard reaction of tryptophan); nutritional-physiological effect of Maillard reaction products (Amadori products); Maillard - reaction between proteins and carbohydrates; factors influencing the Maillard reaction in proteins (temperature, amino acids in proteins, quantity of carbohydrate); indicator-substances to characterize the Maillard reaction in proteins; Maillard reaction of baking industrial products with special regard to fermentation; interactions of oxidized lipids and proteins (oxidation of lipids); effect of oxidized lipids on the physical properties and browning reactions of proteins; and effect of alkaline treatment on the amino acid composition of protein. BSN

3130 EVANS (SR), GREGORY (JF) III and KIRK (JR). Thermal degradation kinetics of pyridoxine hydrochloride in dehydrated model food systems. *J. Food Sci.* 46(2); 1981; 555-8 and 563

Loss of pyridoxine hydrochloride in low moisture model system during roasting is described by a first order kinetics model for 4 different temperatures studied. The effect of heat on pyridoxine degradation rate is described by the Arrhenius equation giving an apparent activation energy of 29.8 Kcal/mol. These data can be used in estimating the potential thermal losses of pyridoxine hydrochloride in ready-to-eat breakfast cereals during toasting or in other similarly processed low moisture foods. MVG

3131 NOJEIM (SJ) and CLYDESDALE (FM). Effect of pH and ascorbic acid on iron valence in model systems and in-foods. *J. Food Sci.* 46(2); 1981; 606-11, and 616

The pH influenced ionisation and valence changes of elemental iron (EI), ferrous sulphate (FS), ferric orthophosphate (FOP) and sodium ferric EDTA (SFEDTA). E1 and FS were completely converted to ferrous iron within 48 hours at pH 4.2 and below; ionisation of FOP and SFEDTA was slower and incomplete and thus resulted in less ferrous iron and more ferric iron. Over one month, most of the ionised iron remained or was converted to ferrous form at pH 2.7. The more reactive iron compounds, E1 and FS remained 100% ionic at pH 4.2 and gradually oxidised to trivalent stage. The overall effect of ascorbic acid was as a reducing agent at low pH and also in promoting oxidation at higher pH values, thus tending to increase ionisation. Thus pH of a food and presence of ascorbic acid appeared to be significant factors in selecting foods for iron fortification. MVG

3132 RASPER (VF), BRILLOUET (JM), BETRAND(D) and MERCIER (C). Analysis of dietary fiber in feces of rats fed with fiber supplemented diets. *J. Food Sci.* 46(2); 1981; 559-63

Dehydrated feces of rats fed with diets supplemented with cereal bran or its components, were analysed by using a procedure based on southgate's fractionation scheme with subsequent colorimetric determination of monometric constituents in the individual fractions. Values of noncellulosic polysaccharide and cellulose so obtained agreed satisfactorily with those obtained by detergent fiber analysis. Similarly sums of neutral sugars closely correlated with values obtained by GLC and Saeman's analysis of defatted samples. However, GLC data were consistently higher particularly with hexoses, the difference being more pronounced with feces than with bran material. Results of proximate and fiber analyses closely approached 100% strengthening the confidence in the evaluated analytical procedure. MVG

3133 HUGHES (RE), ELLERY (P), HARRY (T), JENKINS (V) and JONES (E). The dietary potential of the common nettle. *J. Sci. Food Agric.* 31(12); 1980; 1279-86

TOXICOLOGY AND HYGIENE

3134 COX (NA) and MERCURI (AJ). Accuracy of micro-ID for identification of *Salmonella* and other Enterobacteriaceae from clinical and food sources. *J. Food Prot.* 42(12); 1979; 942-5

3135 LaROCCO (KA) and MARTIN (SE). Effects of potassium sorbate alone and in combination with sodium chloride on the growth of *Salmonella typhimurium* 7136. *J. Food Sci.* 46(2); 1981; 568-70

Effects of potassium sorbate alone and in combination with sodium chloride (2 or 3%) on the growth of *S.typhimurium* ATCC 71 were studied in tryptic soy broth. (final pH 6.3) at 22 C for 15 days and 35 C for 48 hours without shaking. It was found that combinations of sorbate and NaCl was more effective in inhibiting the growth of the organisms than sorbate alone under the conditions and variables studied. 3% NaCl+ 0.3% sorbate, was most effective at both the storage temperatures. MVG

136 PFLUG (IJ), SCHEYER (M), SMITH (GM) and KOPELMAN (M). Evaluation of recovery media for heated *Clostridium sporogenes* spores. *J. Food Prot.* 42(12); 1979; 946-7, 945

137 SOLOMON (HM) and KAUTTER (DA). Sporulation and toxin production by *Clostridium botulinum* type G. *J. Food Prot.* 42(12); 1979; 965-7

138 BUCKER (ER), MARTIN (SE), ANDREWS (GP) and ORDAL (ZJ). Effect of hydrogen peroxide and sodium chloride on enumeration of thermally stressed cells of *Staphylococcus aureus*. *J. Food Prot.* 42(12); 1979; 961-4

139 BENNETT (RW) and McCLURE (F). Extraction and separation of *Staphylococcal enterotoxin* in foods. *J. Assoc. Off. Anal. Chem.* 63(6); 1980; 1205-10

3140 RAO (DR) and PULUSANI (SR). Effect of cultural conditions and media on the antimicrobial activity of *Streptococcus thermophilus*. *J. Food Sci.* 46(2); 1981; 630-2

When *Streptococcus thermophilus* was grown in basal medium with or without fermentable carbohydrate (lactose, glucose or sucrose at 2% level), antimicrobial activity was detected only in the cell-free medium and cells were free of any antimicrobial activity. Peanut milk, soymilk and basal medium with a fermentable sugar supported the production of antimicrobial compound(s) by *S. thermophilus*. Milk-based medium did not appear to be a necessity for such activity. When tested independently, the optimum temperature for maximum production of antimicrobial activity by *S. thermophilus* in whole milk was 50 C while the optimum time of incubation was 48 hour. An initial pH of 6.0 resulted in maximum antimicrobial activity in basal medium with 2% lactose. AA

3141 ABDOLLAHI (A) and BUCHANAN (RL). Regulation of aflatoxin biosynthesis: Induction of aflatoxin production by various carbohydrates. *J. Food Sci.* 46(2); 1981; 633-5

The study of various compounds to induce aflatoxin biosynthesis by *Aspergillus parasiticus* was investigated by initially culturing the organism in a peptone basal medium that does not support aflatoxin production, and then transferring the organism to a replacement medium containing the test compound, ribose, xylose, glucose, fructose, sorbose, mannose, galactose, maltose, sucrose, raffinose, and glycerol induced aflatoxin production. This induction of aflatoxin production was blocked when cycloheximide was incorporated into the replacement medium. Aflatoxin biosynthesis was not induced by lactose, lactic acid, sodium pyruvate, oleic acid, citric acid, sodium acetate, α methyl-D-glucoside, 3-O-methyl-D-glucoside, cAMP, or cGMP. The results suggest that the synthesis of one or more of the enzymes responsible for aflatoxin formation is regulated by the availability of specific readily-metabolizable carbon sources. AA

3142 ANON. Asbestos contamination. *Br. Food J.* 82(895); 1980; 40-2

A review of the FACC Examination of asbestos contamination of food. Aspects covered include chemical and physical properties of asbestos, exposure of asbestos by ingestion, possible sources of asbestos in food and the statutory control. KAR

I N D E X

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Printed by Offset at CFTRI Press, Mysore